**Universidade Nova de Lisboa**
**Instituto de Higiene e Medicina Tropical**

# Research to improve Surgical Oncological care on the Surgical Department, Maputo Central Hospital

**Atílio Luís Monteiro de Morais**

**TESE PARA A OBTENÇÃO DO GRAU DE DOUTOR EM SAÚDE INTERNACIONAL NA ESPECIALIDADE EM POLÍTICAS DE SAÚDE E DESENVOLVIMENTO**

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Tese apresentada para cumprimento dos requisitos necessários à obtenção do grau de doutoramento em Saúde Internacional, Especialidade Em Políticas de Saúde e Desenvolvimento

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**Pesquisa de implementação para melhoria de cuidados em oncologia cirúrgica no Departamento de Cirurgias do Hospital Central de Maputo**

## ELEMENTOS BIBLIOGRÁFICOS RESULTANTES DA DISSERTAÇÃO

A presente dissertação congrega 3 publicações e uma comunicação oral, nomeadamente:

**Identifying barriers and finding solutions to implement best practices for cancer surgery at Maputo Central Hospital, Mozambique**

Atílio Morais, Matchecane Cossa, Adriano Tivane, Jotamo Come, Volodimir Venetsky , Fernando Torres , Victor Pacheco , Miguel Reyes , Germano Pires , Mariana Peyroteo , Satish Tulsidas , Ellen Baker , Moshin Sidat, Maria do Rosário O Martins , Lúcio Lara Santos ***Ecancermedicalscience***, 2018 Oct 23;12:878. [doi: 10.3332/ecancer.2018.878. eCollection 2018]

**Understanding the bricks to build better surgical oncology unit at Maputo Central Hospital: prevalent surgical cancers and residents knowledge**"

Atílio Morais, Matchecane Cossa, Adriano Tivane, Jotamo Come , Volodimir Venetsky, Fernando Torres, Victor Pacheco, Miguel Reyes, Germano Pires, Mariana Peyroteo, Satish Tulsidas, Ellen Baker, Moshin Sidat, Maria do Rosário O Martins, Lúcio Lara Santos. ***Pan African Medical Journal***. 2019;32:83. [**doi**: 10.11604/pamj.2019.32.83.18126]

**Designing a National Curriculum to Advance Surgical Oncology in Mozambique: A Delphi Consensus Study**"

Atílio Morais, Manuel Simão, Matchecane Cossa, Jotamo Come, Carlos Selemane, Adriano Tivane, Satish Tulsidas, Cesaltina Lorenzoni, Jessica Rodrigues, Luís Antunes, Donzilia Brito, Manuel Joao Costa, Moshin Sidat, Maria do Rosario O Martins and Lúcio Lara Santos ***Journal of Surgical Education*** [**doi**: https://doi.org/10.1016/j.jsurg.2020.06.030]

Comunicação Oral "ORGANIZAÇÃO DA UNIDADE DE ONCOLOGIA CIRÚRGICA DO HOSPITAL CENTRAL DE MAPUTO (HCM)", no 5º Congresso Nacional de Medicina Tropical que se realizou de 10 a 12 de Abril de 2019, no Instituto de Higiene e Medicina Tropical, em Lisboa (Anexo I);

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# ABSTRACT

**Purpose**: Regarding adequate care for oncological patients, requiring surgical interventions at the Surgical Department of Maputo Central Hospital (MCH), the largest hospital in Mozambique, the aim of those studies, was first to **assess** the surgical resources, surgical oncology team skills, **identify** and **characterize** prevalent cancers treated and general knowledge in oncology and surgical oncology, expecting the **development of a comprehensive curriculum in surgical oncology fellowship** fit for the Hospital and all Mozambique country.

**Methods:** *The study 1*, done in 2017, was based on surgeons questionnaire (The Cancer Units Assessment Checklist for low- or middle-income African countries (annex I), visiting the unities (oncology service, ICU, operations room, etc.) collecting information according to the Portuguese-speaking African Countries Assessment of Surgical Oncology Capacity Survey (PSAC-Surgery – annex II).

*The study 2*, done in 2018, by retrospective analysis of individual cancer patient registries of MCH, the prevalent cancers has been identified and characterized (annex IV). And the general knowledge in oncology and surgical oncology, this issue was evaluated by simple test administered anonymously and without prior notice to all surgeons and residents at the Surgical Department (annex V). The domains was about basis of Oncology, Radiotherapy, Pathology, Chemotherapy, Pain management, Surgical oncology and Clinical pathway.

*The study 3*, done in 2019, a three-round modified-Delphi approach was implemented to obtain consensus on surgical oncology training curriculum. The participants were purposefully selected 23 experts in surgical oncology working in Mozambique. In round one, participants answered a questionnaire regarding the content of the curriculum and the timing and venue of training. Draft of the curriculum was produced. In round 2, answers from the first round and the curriculum draft were presented to a purposeful selected sample of nationally recognized experts in oncology and surgical oncology, including members of the Mozambican College of Surgeons and leadership of the Ministry of Health. A final round was carried out to discuss the final version of the training program in surgical oncology with extensive participation of majority of african experts in surgical oncology (Aortic, Maputo).

**Results:** Breast, esophagus and colorectal cancers were the most commonly treated neoplasms in MCH (at Surgical department). A range of technical and resource needs as well as the gaps in knowledge and skills were identified.

All surgeons recognized the need to create a training program in oncology at the undergraduate level, specific training for residents and continuing oncological education for general surgeons, to improve the practice of surgical oncology. Basic principles of

oncology and basic principles of surgical oncology should be included in the curriculum of surgical residency in Mozambique, a 24-months fellowship in surgical oncology should take place after residency in the surgical field and should occur at Maputo Central Hospital and at comprehensive cancer centers.

The final proposal for the program was divided into the following structure: a – theoretical components; b - duration; c - location; d - methodology; e - technical skills in oncology; and f - competency and paid particular attention to the oncological diseases prevalent in Mozambique.

**Keys words:** prevalent cancers, national curriculum, surgical oncology

# RESUMO

Objetivo: No sentido de avaliar e implementar um programa de qualidade nos cuidados especializados prestados aos doentes oncológicos, que necessitam de intervenções cirúrgicas no Departamento Cirúrgico do Hospital Central de Maputo (HCM), o maior hospital de Moçambique, conduzimos a presente investigação. Avaliámos os recursos cirúrgicos, habilidades da equipe de oncologia cirúrgica, identificamos e caracterizamos as neoplasias malignas prevalentes e o conhecimento global em oncologia e oncologia cirúrgica dos nossos proficionais. O objectivo ultimo era o de desenvolver um currículo abrangente e adequado para um prrograma de formação em oncologia cirúrgica para o Hospital e para Moçambique.

Metodologia: O primeiro estudo, realizado em 2017, tinha como objectivo inventariar os recursos e incluiu o preenchimento por parte dos cirurgiões de um questionário (Avaliação das Unidades de oncologia para países africanos de baixa ou média renda – anexo II), foram visitadas as àreas hospitalares associadas aos cuidados oncológicos (serviço de oncologia, UTI, sala de operações, etc.)e coletadas informações de acordo com o questionário "Avaliação da Capacidade em Oncologia Cirúrgica dos Países Africanos de Língua Oficial Portuguesa" (PSAC-Cirurgia - anexo III).

No segundo estudo, realizado em 2018, avaliou-se retrospectivamente os registros de doentes com cancro do HCM. As neoplasias malignas prevalentes foram identificadas e caracterizadas (anexo IV). O conhecimento global dos residentes em oncologia e oncologia cirúrgica, foi avaliado por meio de um teste de conhecimentos preenchido de forma anónima e sem prévio aviso (anexo V). Os domínios abordados foram: Bases da oncologia, Radioterapia, Patologia, Quimioterapia, Tratamento da dor, Oncologia cirúrgica e Percurso clínico.

O terceiro estudo, feito realizado em 2019. Com recurso à metodologia Delphi modificada (3 etapas). Participaram 23 especialistas em oncologia que trabalham em Moçambique incluindo oncologistas cirúrgicos. Na primeira rodada, os participantes responderam a um questionário sobre o conteúdo do currículo, o momento e local do treinamento. E foi produzido um rascunho do curriculo. Na segunda etapa, o rascunho do curriculo foi apresentada a uma amostra selecionada de especialistas nacionalmente reconhecidos em oncologia e oncologia cirúrgica, incluindo membros do Colégio Moçambicano de Cirurgiões e líderes do Ministério da Saúde. Na etapa final, para um consenso mais amplo, foi exposto o curriculo a um grande numero de especialistas em Oncologia cirurgica presente na reuniao da Aortic que decorreu em Novembro de 2019 em Maputo. foi discutida a versão final do programa de treino em oncologia cirúrgica. Obteve-se consenso sobre o currículo de treinamento em oncologia cirúrgica para Moçambique.

Resultados: O cancro da mama, do esófago e colorretal foram os tumores malignos mais comumente tratadas no HCM (departamento de Cirurgias). Uma série de necessidades técnicas e de recursos, bem como as lacunas de conhecimento e habilidades, foram identificadas.

Todos os cirurgiões reconheceram a necessidade de criar um programa de treinamento em oncologia ao nível da graduação, e um treino específico para residentes e educação

oncológica continuada para cirurgiões gerais, para aprimorar a prática da oncologia cirúrgica.

Foi produzido o prgrama de formação em Oncologia Cirúrgica. Os princípios básicos de oncologia e princípios básicos de oncologia cirúrgica devem ser incluídos no currículo da residência cirúrgica em Moçambique. Uma sub-especialização de 24 meses em Oncologia Cirúrgica deve ocorrer após a residência na área cirúrgica e a ter lugar no Hospital Central de Maputo, devendo incluir estágios em centros oncológicos de renome e familiares. A proposta final do programa tem a seguinte estrutura: a - componentes teóricas; b - duração; c - localização; d - metodologia; e - habilidades técnicas em oncologia; e f - competência e atenção especial às doenças oncológicas prevalentes em Moçambique.

Palavras-chave: cancros prevalentes, currículo nacional, cirurgia oncológica

# Framework and Thesis structure

Surgical department at Maputo Central Hospital, facing the new nosological reality, in which the burden of oncological disease is notorious, focused on the best practice implementation on oncological care, decided to conduct this research.

This is thesis is a compilation composed by 3 studies, to obtain a PhD title in International Health, Health Policies, at Institute of Hygiene and Tropical Medicine-Universidad Nova de Lisboa (IHMT - Portugal).

The thesis is structured in 3 chapters: chapter I - General introduction, chapter II - Results and chapter III - Discussion and Conclusions.

On the ***first chapte***r, is given the generalities of cancer in Africa and Mozambique, Medical education, Surgical oncology in Mozambique, Justification, Motivation, Ethical considerations, and General objectives of the research.

On the ***second chapter***, as the result, are attached the published articles of the research.

First - **Identifying barriers and finding solutions to implement best practices for cancer surgery at Maputo Central Hospital, Mozambique**.

Second - **Understanding the bricks to build better surgical oncology unit at Maputo Central Hospital: prevalent surgical cancers and residents' knowledge**.

Third - **Designing a national curriculum to advance surgical oncology in Mozambique: A Delphi Consensus Study.**

On the ***third chapter***, based on the general objectives and implemented studies, is prepared a general discussion.

The knowledge in general oncology is important. Surgery is exceptional procedure in the cancer treatment. Surgery oncology is one of main pillar on the cancer care. Training in oncologic surgery directed to residents and general surgeons is the goal.

Regarding, **national cancer reality** and the **gap on oncologic surgery**, the curriculum on surgical oncology is developed, at Surgical department in Maputo Central Hospital, one of the basic steps on the better practice in cancer care in Mozambique.

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## ACRONYMS

ACGME - Accredited General surgery residency program

ASIRs – Age-standardized incident rates

CGSO - Complex General Surgical Oncology Fellowship program

DPE – Departamento de Planificação e Estatística

DALYS – Disability-Adjusted Life Year

GPD – Gross Domestic Product

GLOBOCAN – Global cancer

HIV/AIDS - Human immunodeficiency virus/acquired immunodeficiency syndrome

ISCTM – Instituto Superior de Ciências e Tecnologia de Moçambique

LMIC - Low-middle income countries

MCH – Maputo Central Hospital

KS – Kaposi sarcoma

PHD – Doctor in Philosophy

UCSD – University of California, San Diego

UCM – Universidade Católica de Moçambique

UEM – University Eduardo Mondlane

UEMS - European Union of Medical Specialists

UniLurio – Lurio University

UniZambeze – Zambeze University

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# CHAPTER I

# GENERAL INTRODUCTION

Mozambique is a country located in Southeast Africa bordered by the Indian Ocean to the east, Tanzania to the north, Malawi and Zambia to the northwest, Zimbabwe to the west, and Swaziland and South Africa to the southwest (figure 1). The Mozambique provinces are Niassa, Cabo Delgado, Nampula, Tete, Zambézia, Manica, Sofala, Gaza, Inhambane and Maputo.


Fig. 1 – Mozambique Map

The country's population of around 30 million is composed mostly by Bantu people. Therefore, Mozambique is home to a diverse range of ethnic groups. There are four major groups, each of which can be divided into smaller regional and ethnic groups, but for the most part Mozambicans belong to the Bantu ethno-linguistic family (figure 2).


Fig. 2- Ethnic distribution in Mozambique

The current population of Mozambique is 30,764,735 (December 14, 2019) according United Nations data (1). The gender ratio (male to female) was 0.95. The population density in Mozambique is 39 per $Km^2$. Near 37.8 % of the population is urban (11,472,938 people in 2019). The median age in Mozambique is 17.2 years (figure 3).

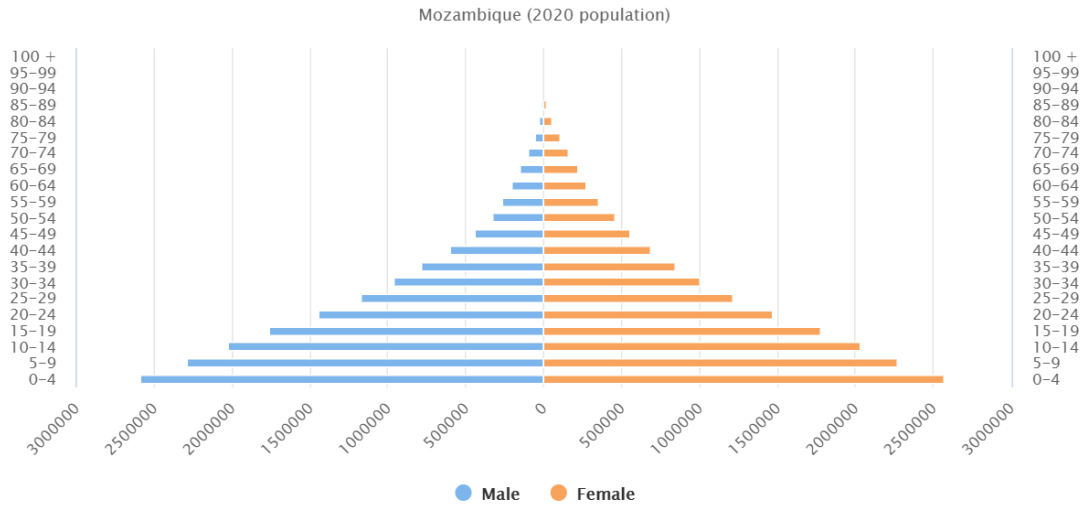



Fig. 3 - Population Pyramid for Mozambique (2020). https://www.worldometers.info/world-population/mozambique-population.

The expected life is 65 years in females and 59.1 years in Males (figure 4).

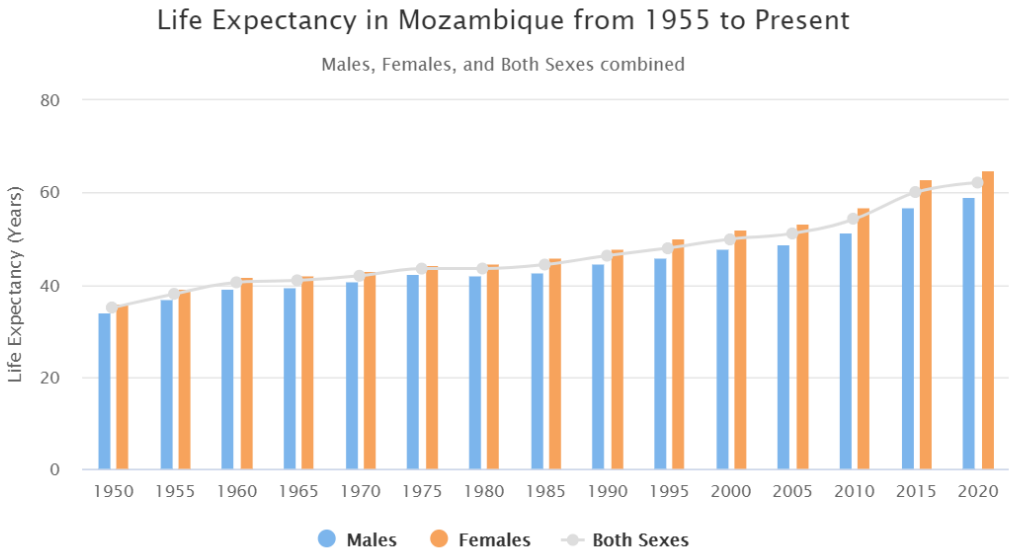



Fig. 4 – Life expectancy (years -2017) - https://www.macrotrends.net/countries/MOZ/mozambique/life-expectancy.

Mozambique economy is based largely on agriculture, but industry is growing, mainly food and beverages, chemical manufacturing, aluminium, and petroleum production. The tourism sector is also expanding. However, the country is still one of the poorest

and most underdeveloped countries in the world ranking low in GDP per capita, human development, measures of inequality and average life expectancy (3, 5)

In 2017, per capita GDP was 1.155 USD dollars, the fertility rate was 4.2 and educational attainment was 4.1 years (1).

The country's burden of disease is largely a consequence of the already mentioned high levels of poverty and a result of infectious and communicable diseases. However, the non-communicable diseases rate is increased including, cancer. Therefore, malignant diseases (4, 8) become sixth cause of death (figure 5).

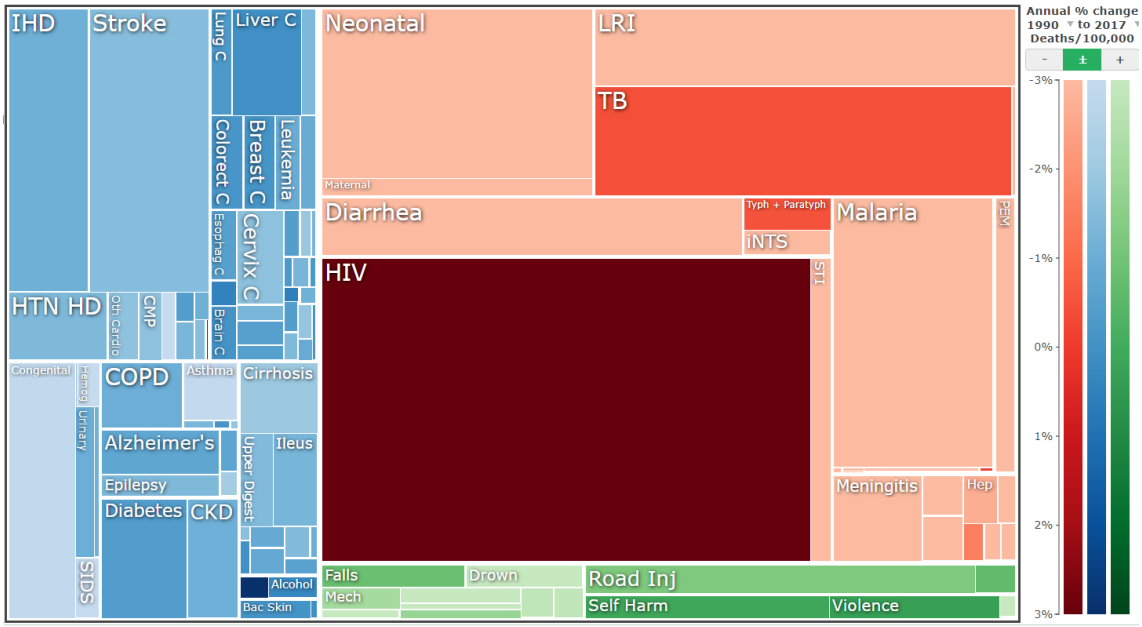



Fig. 5 – Mozambique, both sexes, all ages, 2017, deaths - https://www.macrotrends.net/countries/MOZ/mozambique/life-expectancy

Mozambique's health services are split into four levels. The *primary* level consists of health posts, mobile services, and rural health centres, which carry out basic health services of both a curative and preventive nature. The *secondary* level consists of rural and general hospitals, only some of which can provide surgical services. The *tertiary* level includes the provincial hospitals that are able to offer diagnostic facilities and specialist services, while the *quaternary* level includes the four central hospitals (Maputo, Beira, Quelimane and Nampula), offering a diversity diagnostic facilities and providing diversity of subspecialisation attention.

Progress in establishing health care network and management system has been limited by several factors, which include high rates of infectious disease and malnutrition; a growing prevalence of HIV/AIDS; inadequate access to potable water; lack of trained health personnel and inadequate annually funds allocated for health care system.

In this context, has been the resilience of the Mozambican populations and institutions and the support of various international organizations that have premised advances that lead to an increase in life expectancy.

## 1. Cancer in Africa and Mozambique

In 2018, Global Cancer (2, 12) report 18 million of new cases of cancer registered in the world, with huge mortality around of 9.5 million of death (figure 6).

The Africa (9, 12), contributes with 1.055172 (6%) of the new cases and 693.487 (7%) of mortality (figure 7).

And the malignancy more frequent in those countries, are breast, lung, colorectal and prostatic tumors. But in Africa, the list is enriched by Kaposi Sarcoma (KS), esophagus and liver cancer.

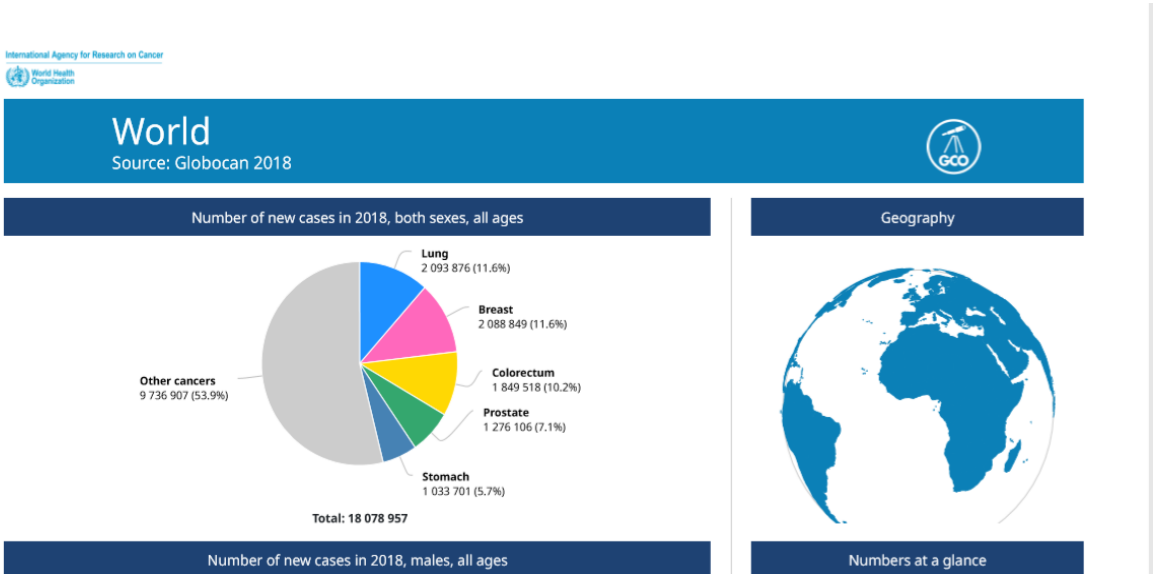



Fig. 6: World Cancer, new cases and global mortality (GLOBOCAN 2018, http://globocan.iarc.fr)

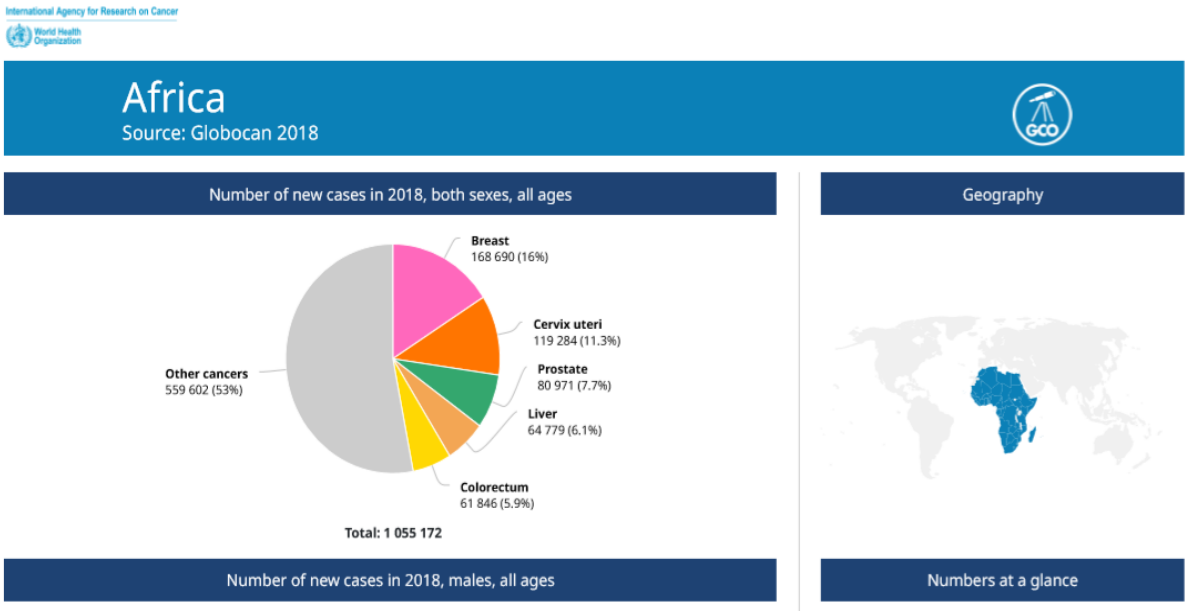



Fig. 7: Africa Cancer, new cases and mortality (GLOBOCAN 2018, http://globocan.iarc.fr)

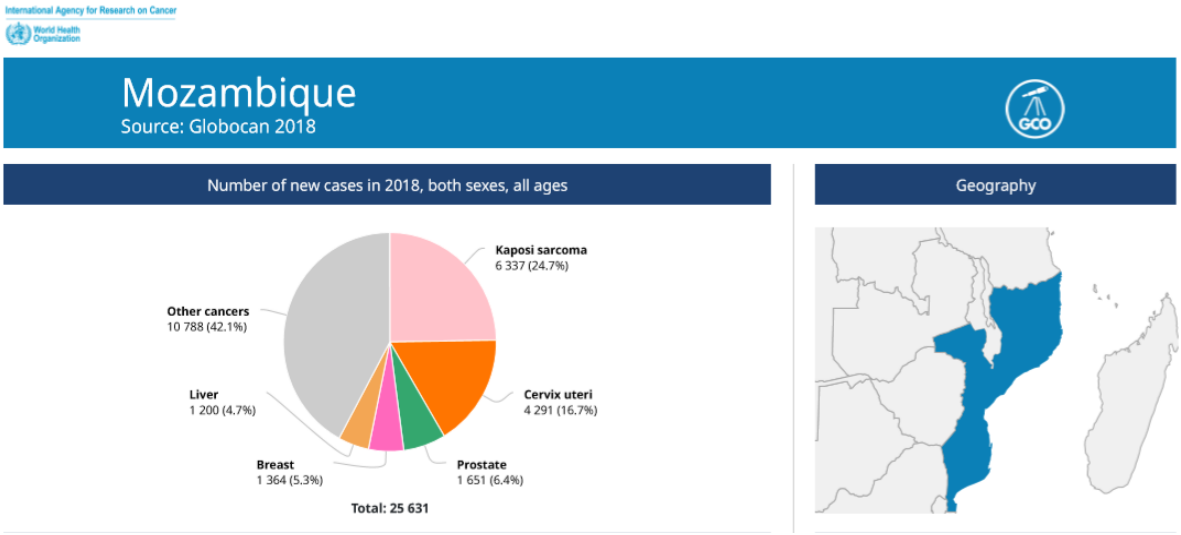



Fig. 8: Mozambique Cancer, new cases and mortality (GLOBOCAN 2018, http://globocan.iarc.fr)

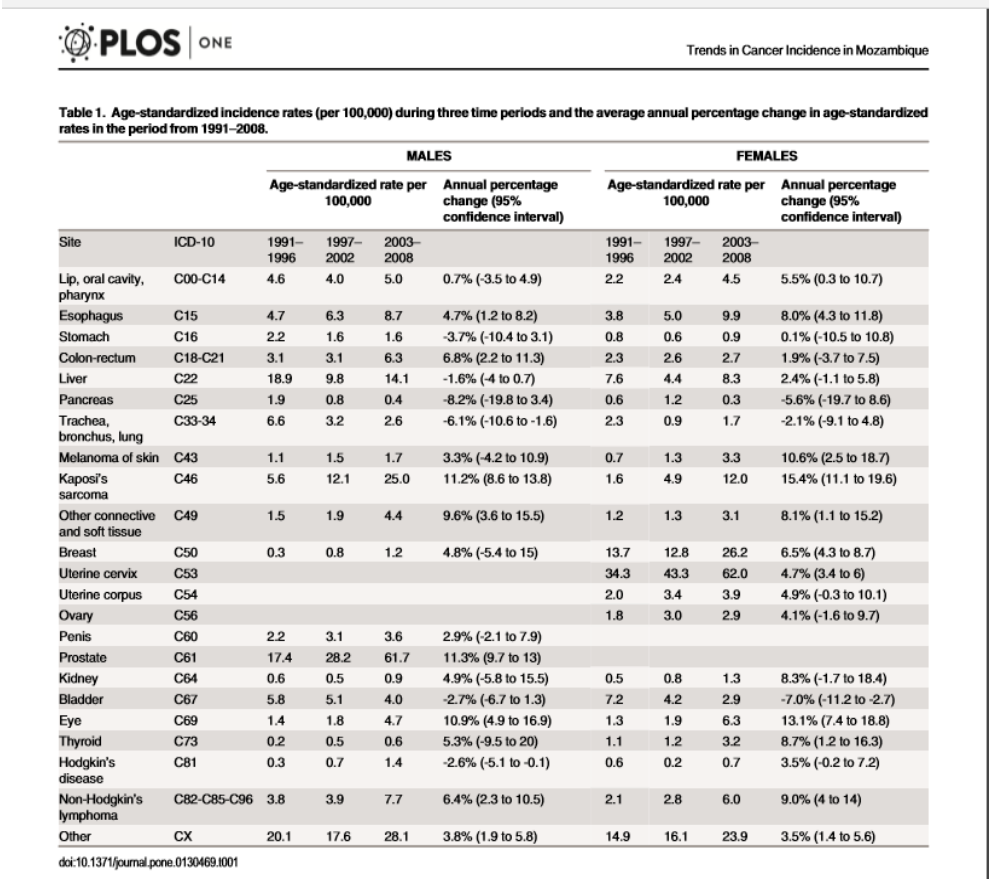
Mozambique (8, 9, 12, 14, 15) contributes with 25631 of the new cases (representing 2% of Africa) and 17813 of death, representing 2.5% of Africa cancer mortality (figure 8).

The increasing burden of cancer in Mozambique should be expected in coming years. Data regarding this (13,14,15), is coming only from one centre in the entire country, Maputo Central Hospital (figure 9).

Maputo Central Hospital (MCH), the largest public hospital (1500 beds), localised at the capital, is the centre with large activity in all kind of training and is where is concentrated basic resources, special for oncologic care (oncology service, pathology service, radiology service, radiotherapy service, etc.).

Fig. 9: Photo from Maputo Central Hospital

According Lorenzoni C et al (14), data from MCH (fig. 10), in terms of the variation in age-standardized incident rates (ASIRs) between 1956–1961 and 2015–2016, the most pronounced declines were for bladder and liver cancers, in both sexes, and increases were greater for prostate cancer among men (172.2%) and breast cancer (237.1%) among women. In the most recent years, ASIRs were at least 40% higher for colorectal and eye cancers in both sexes. Oesophageal cancer varied from 4.4 to 7.0 among men and from 0.0 to 9.4 among women.



PLOS ONE | Trends in Cancer Incidence in Mozambique

**Table 1. Age-standardized incidence rates (per 100,000) during three time periods and the average annual percentage change in age-standardized rates in the period from 1991–2008.**

| | | MALES | | | | FEMALES | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Age-standardized rate per 100,000 | | | Annual percentage change (95% confidence interval) | Age-standardized rate per 100,000 | | | Annual percentage change (95% confidence interval) |
| Site | ICD-10 | 1991–1996 | 1997–2002 | 2003–2008 | | 1991–1996 | 1997–2002 | 2003–2008 | |
| Lip, oral cavity, pharynx | C00-C14 | 4.6 | 4.0 | 5.0 | 0.7% (-3.5 to 4.9) | 2.2 | 2.4 | 4.5 | 5.5% (0.3 to 10.7) |
| Esophagus | C15 | 4.7 | 6.3 | 8.7 | 4.7% (1.2 to 8.2) | 3.8 | 5.0 | 9.9 | 8.0% (4.3 to 11.8) |
| Stomach | C16 | 2.2 | 1.6 | 1.6 | -3.7% (-10.4 to 3.1) | 0.8 | 0.6 | 0.9 | 0.1% (-10.5 to 10.8) |
| Colon-rectum | C18-C21 | 3.1 | 3.1 | 6.3 | 6.8% (2.2 to 11.3) | 2.3 | 2.6 | 2.7 | 1.9% (-3.7 to 7.5) |
| Liver | C22 | 18.9 | 9.8 | 14.1 | -1.6% (-4 to 0.7) | 7.6 | 4.4 | 8.3 | 2.4% (-1.1 to 5.8) |
| Pancreas | C25 | 1.9 | 0.8 | 0.4 | -8.2% (-19.8 to 3.4) | 0.6 | 1.2 | 0.3 | -5.6% (-19.7 to 8.6) |
| Trachea, bronchus, lung | C33-34 | 6.6 | 3.2 | 2.6 | -6.1% (-10.6 to -1.6) | 2.3 | 0.9 | 1.7 | -2.1% (-9.1 to 4.8) |
| Melanoma of skin | C43 | 1.1 | 1.5 | 1.7 | 3.3% (-4.2 to 10.9) | 0.7 | 1.3 | 3.3 | 10.6% (2.5 to 18.7) |
| Kaposi's sarcoma | C46 | 5.6 | 12.1 | 25.0 | 11.2% (8.6 to 13.8) | 1.6 | 4.9 | 12.0 | 15.4% (11.1 to 19.6) |
| Other connective and soft tissue | C49 | 1.5 | 1.9 | 4.4 | 9.6% (3.6 to 15.5) | 1.2 | 1.3 | 3.1 | 8.1% (1.1 to 15.2) |
| Breast | C50 | 0.3 | 0.8 | 1.2 | 4.8% (-5.4 to 15) | 13.7 | 12.8 | 26.2 | 6.5% (4.3 to 8.7) |
| Uterine cervix | C53 | | | | | 34.3 | 43.3 | 62.0 | 4.7% (3.4 to 6) |
| Uterine corpus | C54 | | | | | 2.0 | 3.4 | 3.9 | 4.9% (-0.3 to 10.1) |
| Ovary | C56 | | | | | 1.8 | 3.0 | 2.9 | 4.1% (-1.6 to 9.7) |
| Penis | C60 | 2.2 | 3.1 | 3.6 | 2.9% (-2.1 to 7.9) | | | | |
| Prostate | C61 | 17.4 | 28.2 | 61.7 | 11.3% (9.7 to 13) | | | | |
| Kidney | C64 | 0.6 | 0.5 | 0.9 | 4.9% (-5.8 to 15.5) | 0.5 | 0.8 | 1.3 | 8.3% (-1.7 to 18.4) |
| Bladder | C67 | 5.8 | 5.1 | 4.0 | -2.7% (-6.7 to 1.3) | 7.2 | 4.2 | 2.9 | -7.0% (-11.2 to -2.7) |
| Eye | C69 | 1.4 | 1.8 | 4.7 | 10.9% (4.9 to 16.9) | 1.3 | 1.9 | 6.3 | 13.1% (7.4 to 18.8) |
| Thyroid | C73 | 0.2 | 0.5 | 0.6 | 5.3% (-9.5 to 20) | 1.1 | 1.2 | 3.2 | 8.7% (1.2 to 16.3) |
| Hodgkin's disease | C81 | 0.3 | 0.7 | 1.4 | -2.6% (-5.1 to -0.1) | 0.6 | 0.2 | 0.7 | 3.5% (-0.2 to 7.2) |
| Non-Hodgkin's lymphoma | C82-C85-C96 | 3.8 | 3.9 | 7.7 | 6.4% (2.3 to 10.5) | 2.1 | 2.8 | 6.0 | 9.0% (4 to 14) |
| Other | CX | 20.1 | 17.6 | 28.1 | 3.8% (1.9 to 5.8) | 14.9 | 16.1 | 23.9 | 3.5% (1.4 to 5.6) |

doi:10.1371/journal.pone.0130469.t001

Fig. 10: Variation in age-standardized incident rates (ASIRs) tumours, between 1991-2008 at MCH (Fonte: Lanzeroni C, et al. Trends in cancer incidence in Maputo, Mozambique 1991-2008. *PLoS One*. 2015; 10(6):e0130469)

Also, regarding data from the 2016 MCH Cancer Registry (15), in males, the most common cancers were the prostate, Kaposi's sarcoma (KS), the liver and the oesophagus (figure 11). In females, the most frequent cancers were cancer of the uterine cervix, breast, KS and the liver (figure 12).

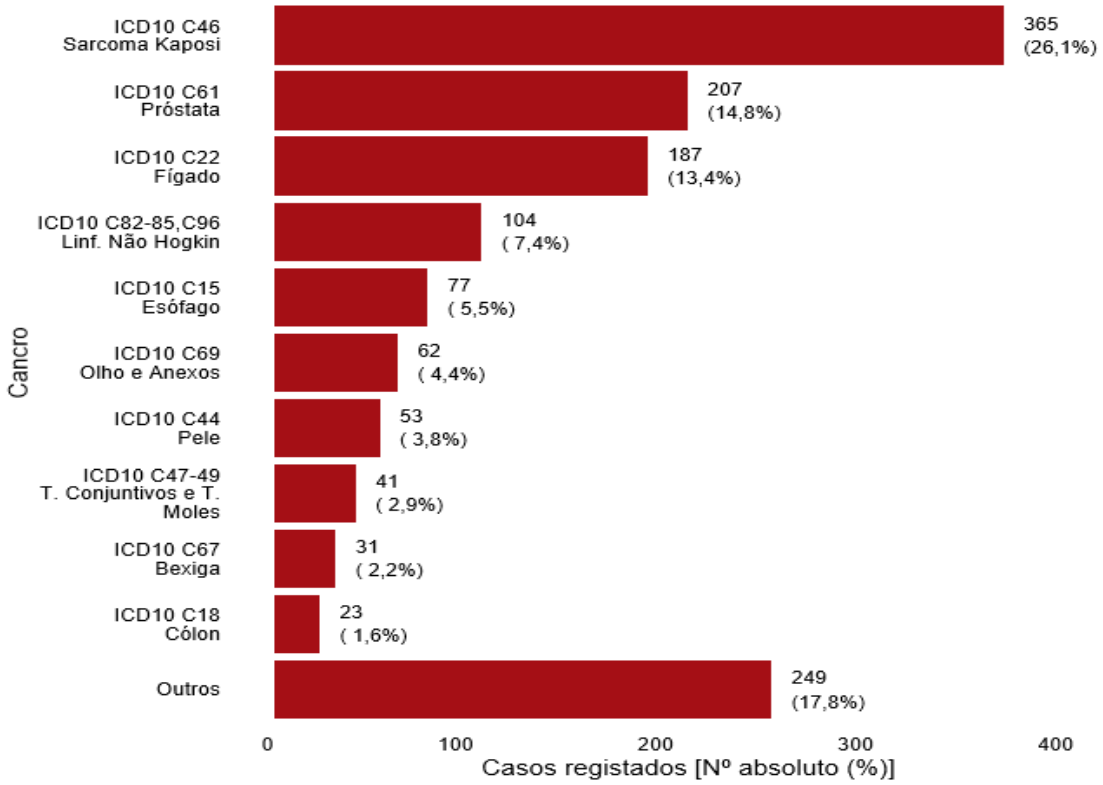



Fig. 11: Male cancer frequency (Source: Cancer Registry, MCH, 2016)

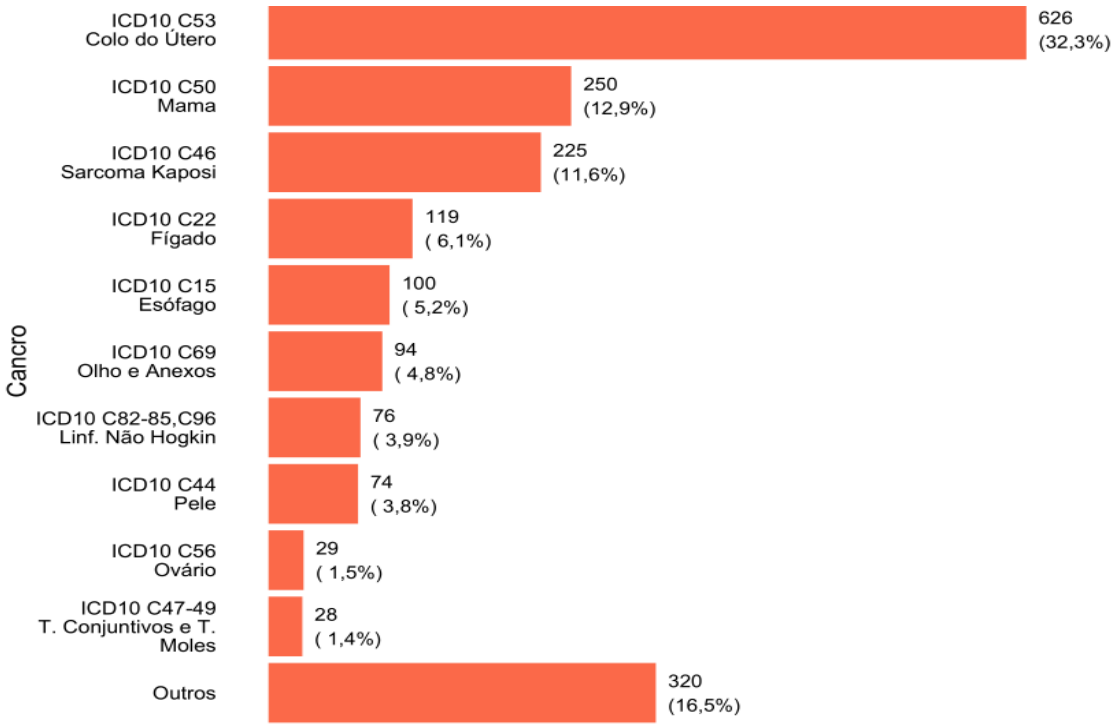
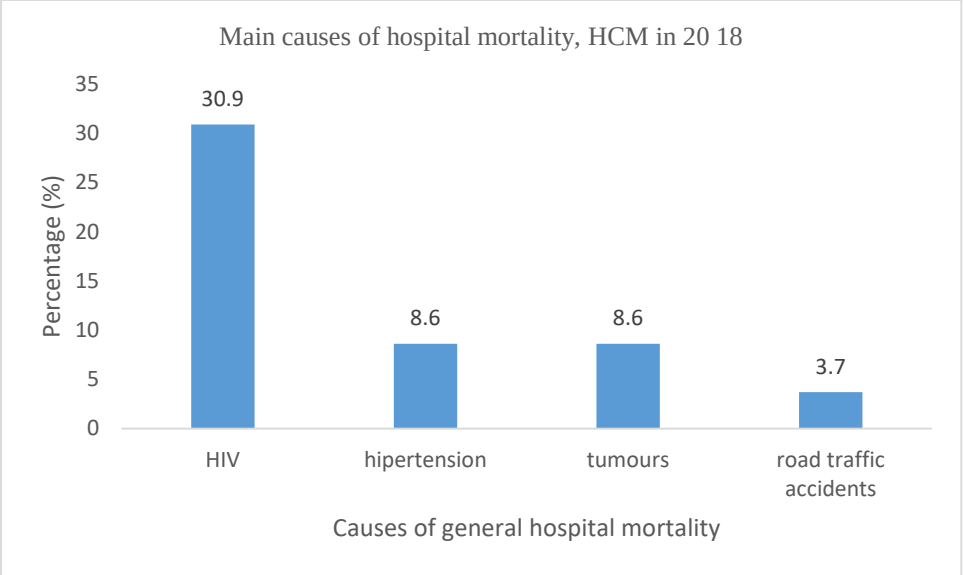
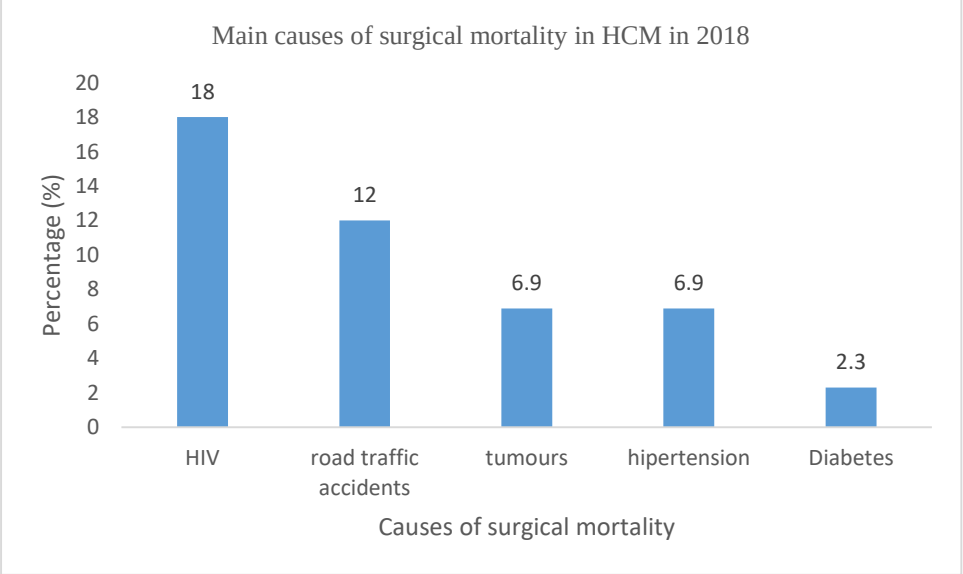



Fig. 12: Female cancer frequency (Source: Cancer Registry, MCH, 2016)

And from MCH annual report 2018 (13), the malignancy tumours are the fourth main cause of general hospital mortality (table 1) after HIV related diseases, cardiovascular disease and Prematurity. Referring, main cause of surgical mortality (table 2), leading in four place, also is malignancy tumours, specifically oesophageal cancer.




Tab.1: Main cause of hospital mortality, MCH (Source: DPE, Annual report, 2018)




Tab.2: Main cause of surgical mortality, MCH (Source: DPE, Annual report, 2018)

The National Program for Cervix and Breast Cancer Control in Mozambique by visual inspection of cervix with acetic acid and clinical examination of the breast, respectively may have contributed toward an increased detection of cervix and breast cancer.

Rising cancer rates calls for proficient policy attention to develop cancer prevention and control programmes.

In this sense, Mozambique launched national cancer control plan 2019-2029 (8) in which underline the need for more resources to address the growing burden of the malignant disease in Mozambique as well as the importance of cancer prevention, education and treatment.

The Oncology Unit of central Maputo (MCH) has been reinforcing its resources. A radiotherapy service was built and a pharmacy dedicated to oncology is under construction. Multidisciplinary therapeutic decision consultations were established in the various areas of oncology. There was a reinforcement in the media and differentiation in diagnostic capacity. However, training in surgical oncology remained an unmet need.

## 2. Medical education in Mozambique

The country's first medical school was established in the colonial period as Universidade de Lourenço Marques, actually Eduardo Mondlane University (UEM) after independence. It has the responsibility to train most Mozambican doctors. In 2007, gradually, the government established four new universities. Three, outside of the capital city Maputo, among them, two are public, Lúrio University (UniLúrio, established in Nampula town), Zambeze University (UniZambeze, in Beira in town) and one private, UCM (Universidade Católica de Moçambique, in Beira town). The last one, private, is ISCTM (Instituto Superior de Ciências e Tecnologia de Moçambique, at Maputo).

Medical specialist training at the MCH was revitalized and restructured. Formal training and curriculum innovation were introduced. Curriculum renewal in the residency training program in Mozambique included competency based medical education,

detailed descriptions of learning objectives, core educational activities, performance metrics and an evaluation system, graduation requirements, and timelines for achieving each. A residency exchange program was launched between University of California San Diego (UCSD and UEM programs to facilitate bilateral sharing of expertise, educational mentoring, and development of English language skills for Mozambican trainees. Mozambican residents completed three-month clinical rotations at UCSD and UCSD residents completed one month rotations at MCH. A total of 25 Mozambican residents and 50 UCSD residents participated. A system of firm chiefs, called «monitores clínicos» and functioning similarly to "chief residents" in the U.S. system, was introduced, involved 12 young specialists and residents. Its objectives were to train in teaching and research methods, and facilitate better monitoring and evaluation of post-graduate teaching and healthcare delivery. A structured didactic program for medical students and post-graduate trainees was introduced, consisting of teleconferences, afternoon lectures, case discussions, journal clubs and practical clinical sessions. Logbooks, designed to record performance and progress of individual residents, were introduced to document the clinical experiences of the internal medicine residents.

## 3. Surgical oncology in Mozambique

Surgical Oncology it's a surgical discipline that covers the treatment of solid tumours such as: the oro-eosophagogastrointestinal tract, of parenchymal and endocrine organs, skin, mesenchymal, neurogenic, bone and soft tissues. Surgical Oncology also includes prevention, genetic counselling, specific diagnostic and staging procedures, rehabilitation and follow-up care. Surgical Oncology is focused on multimodality therapy.

At the present time, oncologic surgery is performed by specialists who, through their training, had the opportunity to have specific but non-formal training or to participate in a short-term surgical oncology training program. There is no program dedicated to

the training of surgical oncologists in the country. The knowledge and skills of a surgical oncologist are:

- Recognize symptoms and signs of cancer;
- Make a diagnostic programme for suspected tumours or metastasis and perform;
- Staging and classification of manifest tumours;
- Perform prognostic assessment;
- Define the role of surgery in a given classified disease reflecting the patient's general condition, including or excluding multimodality approaches in a pre-treatment discussion within a multidisciplinary team;
- Perform an adequate preoperative work-up;
- Perform cancer surgery within his/her specialty with high skill and quality
- postoperative care;
- Decide on and perform adequate follow-up;
- Implement national guidelines into local practice;
- Perform palliative surgical treatment, supportive and terminal care;
- Diagnose, score and treat side-effects and complications of surgical treatment;
- Assess the impact of surgical interventions on quality of life;
- Communicate accurately and adequately to cancer patients and their relatives;
- Manage common psychologic reactions to crisis and final stage of life;
- Practice medicine in accordance with medical ethics and patient's rights.

## 4. Justification

Globally, surgical conditions has been estimated as among main causes of disability and death in low-middle income countries (LMIC), but have been largely neglected healthcare issue with considerable public health and socio-economic impact (2,5,6). An estimated 11 % of the global burden of disease requires surgical intervention, which includes injuries (38%), malignancies (19 %), and congenital anomalies (9 %), complications of pregnancy (6 %), cataracts (5 %), and perinatal conditions (4 %) (1, 6).

In Mozambique, surgery remains the only loco-regional treatment and represents the best hope for the cure, thus a careful evaluation of surgical team skills is critical to improving cancer management (7, 10, 13, 19) According to Snyder and MCH report (13, 19), 14% of the causes of death in the Maputo Central Hospital (MCH) surgery department are oncological diseases and neoplasms accounted for 9% of all surgical discharge diagnoses. The cancer registry of the MCH in 2015–16 pointed out that the malignant tumours most often operated by general and thoracic surgery are breast, oesophageal and colorectal cancer (14, 15). The MCH is major referral hospital with 1500 beds and the last in-country resource for specialized care in Mozambique.

The recent report on human resources desirable for cancer control in LMICs, performed by the National Cancer Institute of USA suggested that currently existing surgical oncologists, medical oncologists and radiation oncologists are lacking in Mozambique. Likewise, the support staffs such as onco-pharmacists, oncology nurses and palliative care specialists are also scarce (6, 7, 11). Recently published paper evaluating the cancer plans for Mozambique revealed that there are only seven oncologists in the country and no oncological surgeons (8, 16). Thus, a capacity building educational cancer program was considered as critical to establish and scale-up oncological surgical care. Establishing and strengthening selected subspecialty surgical care in LMICs could prevent about four hundred thousand deaths and avert 38.9 million DALYs per year. However, surgical care in LMICs face challenges particularly in delivering safe, effective, accessible and cost-effective surgical care which meets ultimately the needs of the populations (7, 9, 11).

Therefore, a critical need exists for provision of training for Surgery residents on surgical oncology to enhance access to oncological surgical services and deliver safe and effective care for Mozambicans burdened with oncological surgical conditions (8, 19, 20, 21). Thus, the studies envisioned for this Doctoral Thesis were aimed to assess the overall needs in surgical oncology resources and competencies for practice and develop evidence-based comprehensive curriculum in surgical oncology for residents specializing in Surgery at the Surgical Department of Maputo Central Hospital, and in Mozambique in general.

## 5. Motivation

The motivation behind carrying out the study included in this thesis were mainly related to the need to provide the country with a quality surgical oncology program. My present role and responsibilities at Maputo Central Hospital which the main referral hospital and the biggest in Mozambique with 1500 beds and multi-specialty and differentiated care provision, facilitate the pursuit of this objective. The fact that I hold presently the position of Director of the Surgery Department which includes 12 Services of different surgical sub-specialities. The Surgical Department of the Maputo Central Hospital accounts for about 40% of hospitalizations, 50% of outpatient consultations and 60% of surgical procedures or interventions (13).

Within the Surgery Department, the neoplastic diseases are progressively increasing in burden from which the tumours of the breast is most common cause of outpatient consultation and hospitalizations for surgical interventions. Other common tumours are from oesophagus and colon-rectal and also tumours of the prostate gland, skin and tumours of head and neck (13, 14, 15). Provision of and/or implementation of an appropriate surgical care for patients with tumours requiring interventions is increasingly worrying Surgeons within the Department and also Mozambican public health authorities (8, 9, 16).

On the other hand, as Thoracic Surgeon, the tumours affecting this anatomical region is my personal concern. The cancer of oesophagus is the most common malignant tumour at the Thoracic and Cardiovascular Surgery Service of Maputo Central Hospital (13, 14, 17). Therefore, an appropriate diagnosis, care and surgical treatment after precise staging of the cancer (for example cancer of oesophagus) as well as an adequate follow-up of operated patients represents some of many concerns we have regarding Oncological Surgical conditions and their likely survival in current context of healthcare system in Mozambique.

## 6. Ethical Considerations

The proposal of the studies included in this thesis were submitted and reviewed by the shared Institutional Bioethics Committee of the Faculty of Medicine of University Eduardo Mondlane and Maputo Central Hospital (annex V) after obtaining approval from the Scientific Committee of the Faculty of Medicine of University Eduardo Mondlane (annex IV) and once the proposal was adequately cleared by the administrative authorities of the Maputo Central Hospital (annex III).

The first and the third studies included in the proposal, because of use of secondary data, did not require informed consent and therefore informed consents were only obtained from the participants of the study two. The data collected were codified and processed observing good practice for anonymity and confidentiality. The data were made accessible only to researchers involved in the studies. The participants were informed about the dissemination of the results of the studies in scientific forum and other events, as well as in form of publications in scientific journals and as part of the doctoral thesis for presentation at Instituto de Higiene and Medicina Tropical of the Universidade Nova de Lisboa, Portugal. Additionally, it is expected that data generated within this study will be used in decision-making processes for improvement of care and treatment of oncological patients occurring in surgical services, in particular for discussion and development of policies/strategies that are deemed useful for prevention and control of cancer in Mozambique. No conflicts of interest were anticipated for carrying out this study.

There were are no risks anticipated for the patients for the effective implementation of the proposed studies. The data collection processes included use secondary data and data collected through in-depth interviews from healthcare professional (simple closed-questions were asked with not apparent discomfort). There were no direct benefits contemplated for the participants of the study. The most important benefits related to implementation of the study were related to scientific evidence that was generated as well as the description of the clinic-pathological profile of the oncological patients, main issues and challenges that were impeding an appropriate surgical care for cancerous patients at the Department of Surgery of Maputo central Hospital. Finally, the results of the studies carried out will be of great use for informing teaching-learning activities

in surgical oncology that are scientifically valid evidenced based new knowledge of common neoplastic malignancies at Maputo Central Hospital.

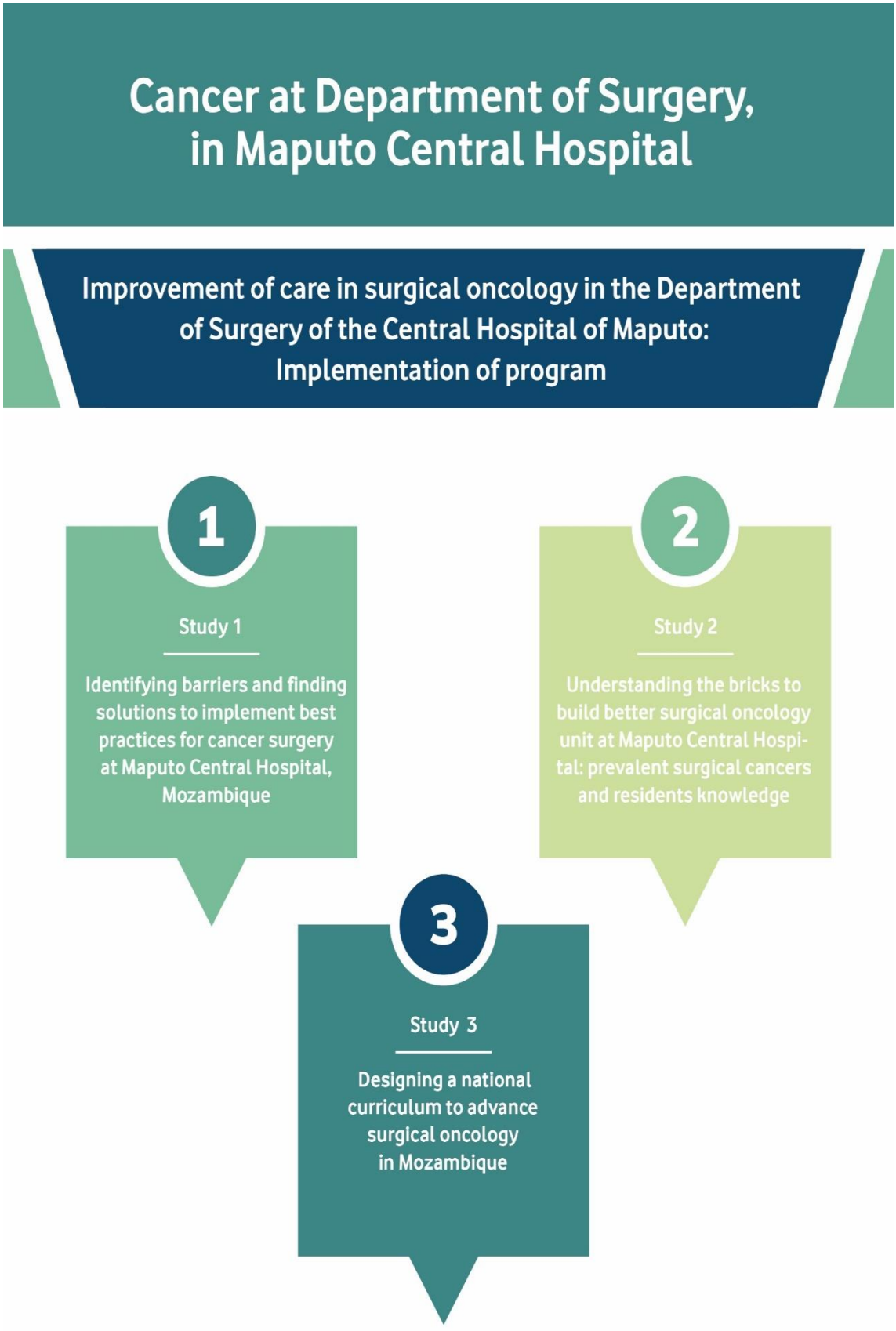
## 7. Objectives

The three main objectives are:

1. To identify barriers and find solutions to implement best practices for cancer surgery at the Department of Surgery at MCH;

2. To describe most prevalent surgical cancers and to evaluate residents knowledge about surgical oncology

3. To design a surgical oncology fellowship for Mozambique and to describe its main competences.


Cancer at Department of Surgery, in Maputo Central Hospital
Improvement of care in surgical oncology in the Department of Surgery of the Central Hospital of Maputo: Implementation of program
1
Study 1
Identifying barriers and finding solutions to implement best practices for cancer surgery at Maputo Central Hospital, Mozambique
2
Study 2
Understanding the bricks to build better surgical oncology unit at Maputo Central Hospital: prevalent surgical cancers and residents knowledge
3
Study 3
Designing a national curriculum to advance surgical oncology in Mozambique

# CHAPTER II

# RESULTS

# STUDY I

## Identifying barriers and finding solutions to implement best practices for cancer surgery at Maputo Central Hospital, Mozambique

**Purpose:** The aim of this study was to assess the surgical resources and surgical oncology team skills at the Surgical Department of Maputo Central Hospital (MCH) in Mozambique to define an educational program to support surgical oncology practice.

facsimile of the article only for thesis purpose

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# Identifying barriers and finding solutions to implement best practices for cancer surgery at Maputo Central Hospital, Mozambique

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Research

## Abstract

**Purpose:** The aim of this study was to assess the surgical resources and surgical oncology team skills at the Surgical Department of Maputo Central Hospital (MCH) in Mozambique in order to define an educational program to support surgical oncology practice.

**Methods:** From January 2017 to December 2017, a general evaluation of the resources of MCH was carried out, as well as its offerings in oncological care in different services. Data were obtained by reviewing documents, visiting surgical services and interviewing key-informants and others informally. In addition, a group of seven surgeons of the Surgical Department of MCH answered a questionnaire about the quality of the cancer units (The Cancer Units Assessment Checklist for low- or middle-income African countries). Subsequently, surgical, anaesthesiology and intensive care facilities were evaluated according to the Portuguese-speaking African Countries Assessment of Surgical Oncology Capacity Survey (PSAC-Surgery). All the data were triangulated in order to identify gaps, develop an action plan and define an educational program.

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**Results:** Breast, oesophagus and colorectal cancers were the most commonly treated neoplasms in MCH. A range of technical and resource needs as well as the gaps in knowledge and skills were identified. All surgeons recognised the need to create a training program in oncology at the undergraduate level, specific training for residents and continuing oncological education for general surgeons to improve the practice of surgical oncology. It was evident that all these interventions needed to be formalised, appropriately certified and count for professional career progression. Based on the local epidemiological data and on these study findings, oncology education programs were developed for surgeons.

**Conclusions:** The findings of this study contributed to the development of an educational program in surgical oncology, considered essential to the training of surgeons at MCH. The cancer educational programs and the mobilisation of adequate resources will ensure the provision of adequate surgical oncology treatments for MCH. The training requirements should be tailored to suit the local needs based on the most prevalent malignancies diagnosed in the region. In our view, this methodology may apply to other countries with similar realities in the formation of surgical oncologists.

**Keywords:** *training, surgical oncology, curriculum development, Mozambique*

## Introduction

Cancer is a major public health problem in Sub-Saharan Africa because of population aging, as well as increased prevalence of key risk factors [1]. The resources available for cancer control are less than adequate in Africa; therefore, standardised cancer treatment for low- and middle-income African countries (LMIACs) is still a major concern and surgery plays an important role in the diagnosis, staging and treatment of cancer [2, 3]. In most LMIACs, as Mozambique, surgery remains the only locoregional treatment and represents the best hope for the cure, thus a careful evaluation of surgical team skills is critical to improving cancer management [4]. In addition, the quantity, quality and functionality of equipment and supplies, availability of running water and electricity, access to safe blood transfusion services, chemotherapy and radiation, the presence of postoperative facilities as well as the number, type and qualification of healthcare personnel should be included in the assessment of cancer surgery quality [4]. Noncommunicable diseases, including cancer, have been considered a major public health problem by the Ministry of Health of Mozambique since 2008 [5].



According to Lorenzoni *et al* [6], in males, the most common cancers are prostate, Kaposi sarcoma (KS), liver and oesophagus. In females, the most frequent cancers are cervix, breast, KS and oesophagus.

The report on human resources needed for cancer control in low- and middle-income countries, performed by the National Cancer Institute suggested that surgical oncologists, medical oncologists and radiation oncologists are an unmet need in Mozambique. In addition, support staffs such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists are also needed. Recently, an article evaluating the cancer plans for Mozambique the authors revealed that there are only seven oncologists in the country and no oncological surgeons [7, 8]. Thus, an educational cancer program is crucial to existing surgical teams and medical students.According to Snyder *et al* [9], 14% of the causes of death in the Maputo Central Hospital (MCH) surgery department are oncological diseases and neoplasms accounted for 9% of all surgical discharge diagnoses [9]. The cancer registry of the MCH in 2015–16 pointed out that the malignant tumours most often operated by general and thoracic surgery are breast, oesophageal and colorectal cancer [10].

In order to develop and implement a Cancer Education Program (CEP) and introduce best practices for cancer surgery at MCH, Mozambique, we assessed current surgical resources and surgical oncology skills.

## Methods

This cross-sectional study was conducted between January 2017 and December 2017 in MCH, a tertiary level hospital in Mozambique. An evaluation of the general capacity of MCH and its offer in oncological care in the different services was done through documental analysis, visits to the services and informal interviews to the providers of oncological care in those services. In addition, a questionnaire was administered to the seven general surgeons of the surgical Department of MCH, who have the main role in the surgical treatment of the most frequent types of cancer, namely, breast (three surgeons), colorectal (two surgeons) and oesophageal cancer (two surgeons).

The questionnaire used was the cancer units assessment checklist for low- or middle-income African countries [11]. Subsequently, surgical, anaesthesiology and intensive-care facilities were evaluated according to the Portuguese-speaking African Countries Assessment for Surgical Oncology Capacity Survey (PSAC-Surgery) in order to identify gaps.

This second instrument assesses the capacity of the hospital to perform surgical oncological procedures; infrastructures available; specific resources to perform breast, oesophageal and colorectal cancer surgery; workforce available, and the number of surgical oncology procedures per year.

The institutions that train health professionals in Mozambique were also evaluated in order to understand the formative capacity and the potential integration of a CEP in their curriculum.

After the visits, interviews, documental analysis and questionnaires assessment, the main needs in general oncology and surgical oncology were identified, in particular, for residents and fellows in general surgery. Moreover, a set of recommendations for the training of general surgeons at MCH Surgical Department were also suggested.

Questionnaires were collected on paper and the data were entered into an electronic database. Descriptive statistics were performed. This study was approved for the Mozambican National Bioethical Committee.

## Results



MCH, a tertiary unit level (1500 beds), is the referral centre for all of the complex surgical care in the country. MCH provides a complete emergency service with advanced diagnostic capacities, inpatient wards for complex medical and surgical care (325 beds in the surgical unit), three fully equipped operating rooms, a fully equipped delivery room, three recovery rooms, an intensive-care unit, two high dependency care units and rehabilitation therapy facilities. The centre is also equipped with respirators, oxygen supply devices, intravenous fluids, blood products, basic microbiology equipment, the main pharmaceuticals (anaesthetics, analgesics, antibiotics) and the main surgical materials (drapes, gowns, dressings, gloves) as well as other consumables (disposable equipment and devices).

Human resources for health at MCH include: nurses—700, operating room nurses—30, anaesthetists nurses—15, anaesthesiologists—20, general physicians—125, obstetricians/gynaecologists—20, general surgeons—10, orthopaedic surgeons—7, pharmacy assistants—40, pharmacists—10, radiology technicians—12, radiologists—3, physiotherapists—2, neurosurgeons—5, thoracic surgeons—3, reconstructive surgeons—3, urologists—4, medical oncologists—3, radio-oncologist—1, medical physics—3, gastroenterologists—4 and pathologists—10.

The first questionnaire was fulfilled by seven surgeons. Cancer diagnosis pitfalls were related with fragile imaging resources and low capacity to perform biopsies guides per image. The specific needs to properly diagnose and treat the most common tumours are summarised in Table 1.

For treatment capacities, the following needs were identified: existence of a safe oncology pharmacy with access to essential oncology drugs according to the WHO list; the improvement of the day hospital facilities; to start the activity of the radiotherapy unit; to endow the surgical services with the missing resources and to produce guidelines to ensure good practice in oncology. Other needs include pre-rehabilitation programs for frail patients, rehabilitation and palliative care. At present, there are no surgeons with formal training and certification in surgical oncology.

All surgeons recognised the need to create a training program in oncology at the undergraduate level. Table 2 shows the training capacity of health professionals in Mozambique where this training should take place. Moreover, a specific training for residents and fellows (wherever possible with practical training in high workload centres) and continuing oncological education for general surgeons to improve the practice of surgical oncology was also recommended (Table 3). Surgeons also underlined that their participation in multidisciplinary decision-making meetings (locally known as the tumour Commission) is infrequent; they also stressed the need to improve the oncological knowledge about the most frequent tumours, scientific research and how to strength external collaborations.

Since the most frequently diagnosed tumours surgically treated at MCH are breast, oesophageal and colorectal cancer and based on the gaps mentioned by the seven surgeons, a Global Curriculum in Surgical Oncology was elaborated and will be tested at the MCH (Table 4) [12].

Table 1. Specific resources lacking to perform breast, colorectal and esophageal cancer surgical treatment.

| | Breast cancer | Colorectal cancer | Oesophageal cancer |
|---|---|---|---|
| **Diagnostic** | imaging resources and to perform core needle biopsy of the breast | Rigid sigmoidoscope | Imaging resources |
| **Surgery** | Patent Blue V for sentinel lymph node biopsy | Bookwalter retractor system | Surgical Clips and Clamps |
| | Fluorescence navigation with indocyanine green for detecting sentinel lymph nodes | Saint Mark's pelvic retractor | Circular and linear staplers |
| | Surgical clips | Surgical stapler for rectum | Harmonic scalpel consumables |
| **Post-operative care** | Aspiration drainage | Provide information and advice on diet to stoma patients | Oesophageal stents |

Table 2. Training capacity of Mozambique in surgery, anaesthetist and nurses.

| Health professional | Academic level (degree) | Years of duration (academic degree, training + residency) | Rotation in oncology during studies | Number of certifying universities/ institutions | Number graduates per year | Educational institutions* | |
|---|---|---|---|---|---|---|---|
| | | | | | | Public sector | Private sector |
| Nurse | BSc | 3 years | No | 4 | 60 | 4 | 4 |
| Nurse Anaesthetist | BSc, AN | 2 + 3 years | No | 1 | 10 | 1 | |
| General practitioner | MD | 6 years | Yes | 8 | 200 | 4 | 4 |
| Anaesthetist | MD + R | 6 + 5 years | Yes | 1 | 3 | 1 | |
| Gynaecologist | MD + R | 6 + 5 years | Yes | 1 | 5 | 1 | |
| Orthopaedist | MD + R | 6 + 4 years | No | 1 | 3 | 1 | |
| Urologist | MD + R | 6 + 5 years | Yes | 1 | 1 | 1 | |
| General surgeon | MD + R | 6 + 5 years | Yes | 1 | 4 | 1 | |
| Thoracic surgeon | MD + R | 6 + 5 years | Yes | 1 | 1 | 1 | |
| Plastic Surgeon | MD + R | 6 + 5 years | Yes | 1 | 1 | 1 | |

BSc = Bachelor of Science in Nursing; AN = Anaesthetic Nursing. MD = Medical Doctor graduation, R = Residency
*According to the Mozambican catalogue of higher education (www.mzformativa.com)

Table 3. MCH CEP (Modules).

| Undergraduate level | General surgery residents | General surgeons* |
|---|---|---|
| Basics of oncology | Basics of oncology | |
| | Breast cancer | Breast cancer |
| | Colorectal cancer | Colorectal cancer |
| | Oesophageal cancer | Oesophageal cancer |
| | Surgical oncology fellowships | Advanced surgical oncology training |

*According their oncological field and surgical expertise

Table 4. Modules and core content of the MCH CEP.

| Module 1—Basics of oncology |
|---|
| Dimensions of the cancer problem in Mozambique; cancer registry; Carcinogenesis; The diagnosis in oncology; cancer prevention, cancer staging; surgical oncology; chemotherapy; radiotherapy; personalised treatment in oncology; multidisciplinary therapeutic approach for cancer; follow-up of the cancer patient; best supportive care; research in oncology; quality in oncological care |
| **Module 2—Breast cancer** |
| Breast cancer epidemiology; breast imaging and diagnostics, including screening; The molecular basis of breast cancer and pathological phenotypes; breast cancer classification; management of BRCA (breast cancer) gene carriers; treatment of ductal carcinoma in situ (DCIS); surgery: standards of care; sentinel node biopsy: technical aspects, intraoperative nodal assessment and localisation techniques; axillary lymph node dissection: indications and technical aspects; oncoplastic breast surgery; reconstructive surgery; Radiation therapy: standard of care; therapies in HR+ breast cancer; therapies in HER2+ breast cancer; therapies in triple negative breast cancer; management of advanced disease. Follow-up |
| **Module 3—Colorectal cancer** |
| Incidence and epidemiology; symptoms; diagnosis; pathology and molecular biology (RAS and BRAF mutational status); histopathology; staging and risk assessment; management of local and locoregional disease; colon and rectal surgery; laparoscopy approach; neoadjuvant and adjuvant treatment; Selection between short-course preoperative radiotherapy and long-course chemoradiotherapy; management of advanced/metastatic disease; treatment of liver and lung metastasis; management of local recurrence; follow-up |
| **Module 4—Oesophageal cancer** |
| Incidence; symptoms; pathogenesis; histological classification; diagnosis and staging; treatment of premalignant lesions with endoscopic therapy or esophagectomy; selection of appropriate treatment; pre-habilitation program; the selection of surgical approach; radiation treatment; combined chemo-radiation; postoperative adjuvant chemotherapy or chemoradiation; endoscopic palliative therapy; chemotherapy for metastatic disease; nutritional support; follow-up |



## Discussion

MCH, the referral centre for all complex surgical care in Mozambique, provides primary surgical care for its local population and is also a teaching hospital. In MCH, the top three solid tumours treated by general and thoracic surgery are breast, oesophageal and colorectal cancer.

This study was particularly helpful to define the global needs of cancer education at the national level and, in particular, at MCH. The results from the first questionnaires revealed a shortage of both technical and material resources and skills/formative deficits. In addition, direct observation through the visit to operating rooms, intensive care and ward facilities was critical in order to identify existing resources and needs. Based on the second questionnaire results, it was possible to assess the needs for quality cancer surgery. We realised the current organisational level of cancer care, all human resources of MCH will be fundamental in the organisation of oncology but most of them, including de surgeons, need specific training. We agree that is also important and crucial to creating a training program in oncology at the undergraduate level. The challenge is how we can do it effectively, taking into account local realities.

The complex nature of cancer makes oncological surgeries highly technically demanding and, therefore, outcomes are improved when surgery is undertaken by experienced multidisciplinary teams of specialists at high-workload centres and with adequate resources [13].

Our results show that surgeons participate erratically in the multidisciplinary therapeutic decision meeting. Multidisciplinary programs provide many benefits for the physicians involved [14, 15]. The attendance of multiple specialists from each discipline in this type of meetings leads to dynamic discussion and learning opportunities for all, especially students and trainees [16]. Multidisciplinary team management is associated with improved outcomes after surgery for breast, colorectal and oesophageal cancer [17, 18].

Stefan *et al* [19] address the various areas of oncology in a very interesting article on education and training for the future in cancer research at the East African Regional Meeting. Unfortunately, in their work, the training of surgical oncologists was not discussed [19]. However, the College of Surgeons of East, Central and Southern Africa developed a fellowship in surgical oncology and the average length of time it takes to train surgical oncologist ranges from 11 to 17–19 years [20]. However, this training is long and does not cover the immediate needs of Mozambique. It is necessary to combine a formal training with a fast-track program (2 years). Thus, in order to improve the quality

of care in MCH, the creation of a comprehensive CEP to address the educational needs of medical students, interns, residents, fellows, nurses and allied health staff is crucial. However, cultural and university education differences of the Lusophone African countries must be taken into account. It is important that training in oncology and surgical oncology considers these differences.

Despite different interventions to train Mozambique oncologists involving Brazilian hospitals, the Calouste Gulbenkian foundation from Portugal, MD Anderson Cancer Center from USA and others, according to the respondents, there were no substantial changes in the practice of surgical oncology at MCH. It seems clear that without integrating these training efforts into an official and formal CEP at different levels (namely, pre-graduate and continuing medical education), the results will continue to be fragile and these activities will be erratic [21, 22].

A surgical oncologist should possess in-depth knowledge of malignancies involving each specific disease site. Thus, our proposal takes into account local resources, the nosological profile, the critical actors on the ground and the need to first create a group of competent trainers who later disseminate oncology training in general and oncology surgery in particular.

We follow the recommendations of Are *et al* [12], regarding the training and certification of surgical oncologists, namely: *The training period should be shortened, if possible. The training requirements can be tailored to suit the local needs based on the most prevalent malignancies diagnosed in the region. LMIACs can proactively partner with foreign countries that offer surgical oncology fellowships. Emphasis also needs to be placed on continuing medical education to remain abreast of the current standards of treatment. Training should include the basic principles of chemotherapy and other disciplines of oncology. Surgeons should also be equipped with knowledge on pain, palliative care in order to improve the quality of life for cancer patients* [20].

In the definition of the contents suggested in our programme, we adopted the global curriculum in surgical oncology suggested by Are *et al* [12], the recommendations of Mozambican surgeons, but we prioritise the surgical treatment of the most prevalent malignancies in Mozambique, as had already been done in other Lusophone African countries with success [23].

As a whole, during the 2 years surgical oncology fellowship programme (during surgical residency), the clinical rotation includes: 12 months spent in the surgical oncology department of a high-volume centre, focusing on complex oesophageal and gastrointestinal malignancies, pancreatic and hepatobiliary malignancies, breast cancer, melanoma, head and neck cancer, bone and soft-tissue sarcoma and foregut malignancies; 1 month in a radiation therapy unit; 1 month in a pathology unit and 1 month in a medical oncology department. The remaining 9 months will be spent in Mozambique conducting oncological research activity.

For formal general and thoracic surgeons, MCH should offer advanced training opportunities in surgical oncology (3 months) who have before completed the basic oncology training program and are interested in an additional intensive experience in advanced surgical oncology related to their specific area, namely, breast cancer, colorectal or oesophageal cancer. In our view, this methodology may apply to other countries with similar realities, daily activity and difficulties encountered should become teaching and research issues in order to overcome them properly. Specific topics, such as assessment based on decision making on assignment as trusted professional activities, is probably a useful methodological option in this context [24].

Thus, the proposal of our study should be discussed by the country's health and university authorities and by the college of surgeons in order to integrate this Mozambican program for training surgical oncologists and then evaluate its effectiveness.

Similar programs should be implemented in other African countries, demonstrating their capacity to adapt to their specific reality and conditions. Those responsible for the training of surgical oncologists from countries with high resources should, according to the difficulties we have studied, develop specific and adapted courses that can be used as a complement of the training capacities of developing countries. For surgical oncology fellows in higher-resource settings specifically, the learning benefits of rotations in LMICs are even greater since they learn to deal with cancer patients at advanced stages or different cancer biology, in countries having fewer screening options, fewer imaging options, as well as limited perioperative care [25].

## Conclusions

The findings of this study contributed to the development of an educational program in surgical oncology considered essential for the training of surgeons and residents of surgery at MCH. Undergraduate medical training programmes should incorporate oncology education.

Cancer education should fully integrate all healthcare professionals involved in cancer care. The educational cancer program and the mobilisation of adequate resources will ensure the provision of adequate surgical oncology treatments at MCH. The training requirements should be tailored to suit the local needs based on the most prevalent malignancies diagnosed in the region. In our view, this methodology may apply to other countries with similar realities in the training of surgical oncologists.

## Conflicts of interest

Ellen Baker is the director of Project ECHO, MD Anderson, USA.

For the other authors, there are no conflicts of interest to disclose and no financial or commercial relationships.

## Authors' contributions

This study was conceptualised, designed and written by Atílio Morais and Lúcio Lara Santos. Acquisition of data was carried out by Atílio Morais, Adriano Tivane, Matchecane Cossa, Jotamo Come, Volodimir Venetsky, Fernando Torres, Victor Pacheco, Miguel Reyes, Germano Pires. Analysis and interpretation of data were done by Atílio Morais, Mariana Peyroteo and Lúcio Lara Santos. Ellen Baker, Satish Tulsidas, Maria Rosário Martins, Moshin Sidat and Lúcio Lara Santos revised the article for important intellectual content. All authors read and agreed to the final version of this manuscript. Atílio Morais and Lúcio Lara Santos equally contributed to this study.



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# STUDY II

## Understanding the bricks to build better surgical oncology unit at Maputo Central Hospital: prevalent surgical cancers and residents knowledge

**Purpose:** Cancer is a growing concern in Mozambique. However, the country has limited facilities and few oncologists. Surgical oncologists are an unmet need. The aim of this study was to assess residents' knowledge in prevalent cancer domains and to identify and characterize prevalent cancers treated by surgery at Maputo Central Hospital, the largest hospital in Mozambique. The expectations were that the findings shall inform the development of a comprehensive curriculum in surgical oncology fellowship fit for the Hospital.

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# Understanding the bricks to build better surgical oncology unit at Maputo Central Hospital: prevalent surgical cancers and residents knowledge

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Key words: Cancer surgery, Resident knowledge, Mozambique

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**Abstract**

**Introduction:** cancer is a growing concern in Mozambique. However, the country has limited facilities and few oncologists. Surgical oncologists are an unmet need. The aim of this study was to assess residents' knowledge in prevalent cancer domains and to identify and characterize prevalent cancers treated by surgery at Maputo Central Hospital, the largest hospital in Mozambique. The expectations were that the findings shall inform the development of a comprehensive curriculum in surgical oncology fellowship fit for the Hospital. **Methods:** to identify and characterize prevalent cancers, we performed a retrospective analysis of individual cancer patient registries of Maputo Central Hospital (MCH), Mozambique. Information was recorded into data collection sheets and analyzed with SPSS® 21. To assess MCH residents oncologic knowledge, we invited Twenty-six junior residents (49% of all residents) of different specialties to take a 30 item multiple choice written test used elsewhere in previous studies. The test focused on the domains of Basis of oncology, Radiotherapy, Pathology, Chemotherapy, Pain management, Surgical oncology and Clinical Pathway. The test was administered anonymously and without prior notice. We analyzed the overall test and topic performance of residents. **Results:** the study covered a period of 3 years and 203 patients. The most prevalent malignant tumors treated by general and thoracic surgery in MCH cancer registry were esophageal (7%), female breast (6.5%) and colorectal cancer (2.8%). Globally these malignancies were diagnosed at an advanced stage of the disease and required a multimodal treatment. The mean percent correct score of residents was 37.3%. The dimension with the highest percent correct score were clinical management (46%) and surgical oncology (28%) showed the lowest correct score. **Conclusion:** in Maputo, Mozambique esophageal, breast and colorectal cancer were the most prevalent malignancies treated, with surgery, by thoracic or general surgery in MCH. The test scores suggest that, among residents, the knowledge in oncology needs to be improved, rendering support to the need of a surgical oncology training tailored to suit the local needs. Specific training should take into account local cancer prevalence, resources, their quality and the support of surgical oncology services with volume and experience.

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## Introduction

Cancer is a growing concern in Mozambique [1]. However, the provision of care to cancer patients is conditioned by the country limitations on facilities and specialized oncologists [2]. Patients with advanced stages poses huge challenges in terms of adequate and effective treatment [3, 4]. Cancer surgery, the oldest therapy modality remains the mainstay of treatment for solid tumors in countries with limited resources. In some less-developed regions of the world, surgery may be the only viable cancer treatment option [5]. Surgery is effective in the treatment of localized or locally advanced primary tumors and may prolong survival after surgical resection of distant metastases [6]. Thus, surgical oncology, as a subspecialty of general surgery, has emerged to play an increasingly important role in the multidisciplinary treatment of cancer. Effective cancer surgery is a combination of complex variables including the biology of the disease, patient health circumstances, and resources available, all intertwined with the surgeon's judgment and skill [7]. Unfortunately, more than three-quarters of cancer patients in low-income and middle-income countries (LMICs) do not receive timely, safe, and affordable cancer surgery [5, 8]. To address this impending problem of lack of adequate surgical care for cancer patients on the global stage, the European Society for Surgical Oncology (ESSO) and the Society of Surgical Oncology (SSO) outlined a framework of a global curriculum in surgical oncology education and training [9]. Such a framework is expected to enhance the quality of the specialists. However, the number of cancer surgeons that successfully accomplished this curriculum is insufficient. Therefore, this is an unmet need [10]. According to Murray Brennan of Memorial Sloan-Kettering Cancer Center in New York, cancer surgeon need to: (1) understand etiology and genetic predisposition; (2) understand prognostic factors and natural history; (3) perform cost-effective treatment; (4) develop clinical trials; (5) guides advanced disease management; (6) guide compassionate support; and (7) evaluates outcome [11]. Sullivan R *et al.* argued that there are no one-size-fits-all system solutions to train surgical oncologist, but because surgery is so central to patient outcomes, focusing on this as a central part of national cancer control plans is crucial [7]. In Mozambique, cancers are prevalent. For example, 2016 and 2017 statistical data from the Surgical Department of Maputo Central Hospital (MCH) show that, out of 7051 operations performed (minor procedures were excluded), 606 (8.6%) were malignancies. The most prevalent malignant tumors treated by general and thoracic surgery, according to 2015-16 MCH cancer registry (1705 patients), were esophageal (7%), female breast (6.5%) and colorectal cancer (2.8%) [3]. Recently, Morais A *et al.* studied in depth the surgical resources available at the MCH to perform oncologic surgery, the difficulties manifested by the surgeons during the surgical treatment of cancer and also designed a draft training program in cancer surgery [12]. In Mozambique, surgeons are proficient in general surgery, namely in the treatment of trauma and of surgical complications of infectious diseases. However, in what regards malignant neoplasm surgery, their knowledge and experience need to be enhanced. Therefore, is essential to train and certify surgical oncologist according to good oncological practices [13]. So, we must build our solution, taking into account the resources that we have, our cultural identity, the local nosology, the knowledge that future specialists have at the moment, the supports and partnerships that we already have and those we can involve, in order to quickly form the trainers who will ensure the future in this field. In Maputo, the training of the residents is carried out at Maputo's Central Hospital (MCH), the largest hospital in Mozambique. The development of a fit for purpose, comprehensive and fast-track training program in surgical oncology at MCH, requires the characterization of the clinical and pathological profile of the most prevalent cancer surgery at Central Hospital de Maputo. In response to the shortage of information do develop an oncology training program, this study had two primary aims, namely: I. the characterization of the most prevalent malignant tumors treated at MCH; II. surveying resident's knowledge of surgical oncology.

## Methods

**Identification of the most prevalent malignant tumors treated at the department of surgery:** we conducted a retrospective analysis using database onto cancer surgery from Maputo Central Hospital and according to a checklist for retrospective database studies [14]. Information was collected from the operating room logbooks and records of patients dated from January 1, 2014, to December 31, 2016. Cancer cases were categorized according to demographic data, organ, diagnosis, histologic type, stage and treatment (surgical and/or systemic). Histologic type and stage were classified according to WHO tumor classification and European Network of Cancer Registries (ENCR) recommendations for condensed TNM for coding the extent of disease, respectively [15-18]. Only full records were included. The three most frequent malignant tumors treated by thoracic or general surgery were also

classified according to the reported intention of treatment as curative or palliative.

**Assessment of basic and clinical oncology knowledge:** twenty-six (49% of all MCH residents) residents of different specialties-general surgery, thoracic surgery, otolaryngology, medical oncology, pathology and gastroenterology- who would participate in an oncology course organized by the Surgical Department of MCH, were invited by the course promoters, to individually perform a written test. All participants were ensured that the results would not have consequences for their professional life. The test was administered under proctoring conditions with time limit of 60 minutes. These residents answered a written test, developed by LLS which had been used for similar purpose in Portugal (Master Degree in Oncology, Specialization in Clinical Oncology) and in other Portuguese speaking countries [19]. The test was composed of selected response items and assessed seven dimensions of oncology during a single test session. The test blueprint included: Basis of oncology, Radiotherapy, Pathology, Chemotherapy, Pain Management, and Clinical Pathway. The item contexts were breast, esophagus, oral cancer and colorectal cancer. The test was made of 30 items, there were 12 single best answers multiple choice, 15 multiple true/false, 2 correspondence and 1 short answer item. We calculated individual participant scores, item percent correct scores and discrimination, we also test reliability using Cronbach´s alpha. For data analysis we used descriptive statistics. The study was approved by the Mozambican National Bioethical Committee.

## Results

**Malignant tumors more prevalent treated at department of surgery:** the most common cancers treated by surgery (general or thoracic), in the study period, were in order of frequency 156 (77%) breast, 25 (12%) esophagus and 22 (11%) colorectal (Table 1). More than a half of the 25 HCM patients with esophageal cancer were women, and the median age at diagnosis of 50 years (Min 27; max 74); colorectal cancer was most prevalent in men and over the 22 patients with median 47 years (Min 24; max 83). Breast cancer patients were exclusively women with median 49 years (Min 18; max 84).

**Esophageal cancer:** globally these malignancies were diagnosed at an advanced stage of the disease. The late diagnosis limits the offer of surgical treatment with curative intent is associated with poor survival [20]. Regarding the location of tumor, 12 were of the middle third and 12 of the lower third and only one case was of the upper third. Twenty-three cases were squamous cell carcinomas and two were adenocarcinomas. In most tumors, the attempt of curative resection was performed and if it was not possible a palliative resection or surgical bypass was performed (n=22), in order to preserve the feeding of these patients. The Ivor-Lewis operation was the most accomplished. In the cases, without conditions for thoracotomy, we performed feeding gastrostomies. The systemic treatment used cisplatin and fluorouracil (5-FU), regardless of its setting. Radiotherapy is not yet available in HCM.

**Colorectal cancer:** in these tumors, also, diagnosis occurs in an advanced stage. Regarding the location of these tumors, 3 (13.7%) were of the right colon, 3 (13.7%) were of the left colon, 2 (9.0%) were of the sigmoid and the remaining 14 (63.6%) were of the rectum. Most tumors were adenocarcinomas (86.4%), two squamous cell carcinomas were associated with advanced anal canal carcinomas (patients 43 and 83 years old) and one case revealed that it was a lymphoma involving the colon (patient 42 years). It was only possible to perform curative surgery in 4 (18.1%) since patients are referred or reach HCM with unresectable disease. Systemic treatment used 5-FU or irinotecan (in 4 cases the intention was adjuvant). The disease stage in most cases suggests poor survival.

**Breast cancer:** in MCH, multidisciplinary oncology treatment decision on breast cancer is already established and most breast malignant tumors are treated with systemic neoadjuvant treatment since they are locally advanced malignant tumors. The modified radical mastectomy was the most frequent surgical option (88.5%). When the study was performed, we had no access to radiotherapy and so, we did not perform conservative breast surgery. The exceptions were the cases that, to complete treatment radiotherapy was performed abroad. Advanced breast cancers sometimes develop complex wounds with associated pain, infection, massive discharge, malodor and bleeding, which distresses patients. Therefore, we performed Palliative surgery in these cases, allowing the patients to feel a more comfortable. Adriamycin-Cyclophosphamide (AC) followed by Paditaxel (PC) was the most frequent options. Cisplatin is used in triple-negative or non-responder tumors and hormone therapy is prescribed when indicated.

**Resident's knowledge:** the reliability of the test was 0,728 (which indicates an acceptable internal consistency) and all but one item

showed positive discrimination indexes. Table 2 summarizes the participant overall and domain results percent correct scores. The mean percent correct score for the test was 37.3%. The dimension with the highest percent correct score were clinical management (46%) and surgical oncology (28%) showed the lowest correct score. In what concerns participant performance, the average percent correct score was 40% (Maximum= 60.0%, Minimum=13.5%).

## Discussion

In this study, we found that in Maputo, Mozambique esophageal, breast and colorectal cancer were the most prevalent malignancies treated by general and thoracic surgery in MCH (3). Main cases were locally advanced and their treatment needs high expertise and associated treatments. The finding on oncological knowledge of residents reveals that Mozambique needs to develop at the medical school level, a cancer education program. In addition, the results support the argument that a comprehensive cancer program in order to train all residents must be integrated in the residency training program. It is also necessary, train surgeons (future mentors) and residents of surgery in surgical oncology, prioritizing the most prevalent tumors in the country. Currently, the Project ECHO Mozambique that is ongoing, as a result of a collaborative effort between MD Anderson, three medical institutions in Brazil, the Maputo Central Hospital (Mozambique) and the Ministry of Health in Mozambique [21]. This partnership is working to increase clinical capacity through a comprehensive training program including regular telementoring, hands-on training workshops and professional exchanges including in cancer surgery. Additionally, the "Integrated care for the cancer patient" a program of the Calouste Gulbenkian Foundation, Portugal is in-course to strengththe institutional capacity of the Central Hospital of Maputo, Mozambique, by improving cancer education (that include cancer surgery), screening, diagnosis, treatment and registration of oncological diseases [22]. However, and according to Morais A *et al.* the absence of an agglutinative program of these interventions and their combination with the national training activities are responsible for poorly structuring results [12]. About Collaborative Programs and their effective results, we endorse the editorial recently published in JGO journal by Bishal Gyawali and Gilberto Lopes in which they refer about non-formal cancer education: "It is still an open question if these investments actually lead to better outcomes ... we need to create measures and performance indicators that reflect positive changes and improvements in cancer control efforts "[23]. Kenya, for instance, to solve similar problems, evaluated with their cancer research and control stakeholder program and their national program together in order to strengthen the national cancer control plan [24]. We believe that, in addition to non-formal training, the formal and specific training of cancer education is the key and should involve local universities, colleges of surgery and scientific societies. They must have potential support of international organizations such as African Colleges of Surgery, African Organization for Research and Training in Cancer (AORTIC), ESSO and SSO. In this sense, in June 2018 in Cape Verde, the III Portuguese-speaking African Countries Oncology Congress (PALOP-AORTIC meeting) concluded that the organized and formal formation of medical doctors, surgical residents and surgical specialists along with the current non-formal training may be the better solution [25]. Thus, the development of a workforce is one of the ways of contributing to the realization of the Mozambican Initiative in Surgical Oncology (MISO), a program that we intend to develop integrating all in order to quickly fill the gap in cancer surgery. The training program for residents of surgical oncology should include, in addition to training in MCH, training in surgical oncology services with volume and experience. Morais A and colleagues pointed out the need to assure the basic requirements to treat patients with esophageal, breast and colorectal cancer, and the need to implement the notion that the therapeutic decision must be multidisciplinary [12]. This study stresses the need of a training program for residents and surgeons for delivery safe and effective cancer surgery.

## Conclusion

According to this study, surgical oncology training is crucial, and we suggest it should be condensed and tailored to suit the local needs. The oncology education program should be taught initially at the university level and improved during medical specialties. This specific training should take into account local cancer nosology, resources, their quality and the support of surgical oncology services with volume and experience. It is crucial to coordinate all training efforts efficiently so that results are relevant.

**What is known about this topic**

- There is a growing incidence of cancers in Mozambique and a concern that surgical oncology training may be insufficient.

**What this study adds**

- The study identified the cancers most frequently treated at MCH and revealed important gaps in resident's knowledge about surgical oncology. The findings support the need of a local curriculum and provide directions for the development of a program in surgical oncology, which might be transferrable to other developing countries, taking into account local cancer nosology, resources, knowledge of oncology among residents and stakeholder support.

## Competing interests

The authors declare no competing interests.

## Authors' contributions

This study was conceptualized, designed, performed and written by Atílio Morais and Lúcio Lara Santos. Atílio Morais, Lúcio Santos, Adriano Tivane, Carlos Selemane, Germano Pires, Matchecane Cossa, Satish Tulsidás and Jotamo Come contributed to the collection of data. Luis Antunes carried out the statistical study. Atílio Morais, Luis Antunes, Manuel Costa, Moshin Sidat, Maria do Rosário Martins, Carla Carrilho and Lúcio Lara Santos read, corrected the manuscript. Atílio Morais, Jotamo Come and Lúcio Lara Santos equally contributed to this study. All authors agreed to the final version of this manuscript.

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## Tables

**Table 1**: demographics characteristics and overall survival of the patients treated by the surgical department of the MCH

**Table 2**: results obtained by the 26 residents for different themes of oncology knowledge

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**Table 1:** demographics characteristics and overall survival of the patients treated by the surgical department of the MCH

| **Variables** | **Patients with Esophagus cancer (n=25)** | | **Patients with Colorectal cancer (n=22)** | | **Patients with Breast cancer (n=156)** | |
|---|---|---|---|---|---|---|
| **Age at diagnosis** (years) | 50 | | 47 | | 156 | |
| **Median** (min; max) | (min - 27; max - 74) | | (min - 24; max - 83) | | (min - 18; max - 84) | |
| **Gender** | **n** | **%** | **n** | **%** | **n** | **%** |
| Male | 11 | 44.0 | 13 | 59.1 | 0 | 0 |
| Female | 14 | 56.0 | 9 | 40.9 | 156 | 100 |
| **Surgical treatement intent** | **n** | **%** | **n** | **%** | **n** | **%** |
| Curative | 0 | 0 | 4 | 18.2 | 139 | 89.1 |
| Paliative | 25 | 100.0 | 18 | 81.8 | 17 | 10.9 |
| **Systemic treatment** | **n** | **%** | **n** | **%** | **n** | **%** |
| No | 12 | 48.0 | 18 | 18.2 | 18 | 11.5 |
| Yes | 13 | 42.0 | 4 | 81.8 | 138 | 88.5 |

**Table 2:** results obtained by the 26 residents for different themes of oncology knowledge

| **Oncology knowledge domain** | **Number of questions** | **Correct answers** | **Total answers** | **Correct answers (%)** |
|---|---|---|---|---|
| Basis of oncology | 7 | 75 | 182 | 41.2% |
| Radiotherapy | 2 | 12 | 52 | 23.1% |
| Pathology | 2 | 15 | 52 | 28.8% |
| Chemotherapy | 6 | 49 | 156 | 31.4% |
| Pain management | 3 | 35 | 78 | 44.8% |
| Surgical oncology | 3 | 22 | 78 | 28.8% |
| Clinical pathway | 7 | 83 | 182 | 45.6% |
| **Total** | **30** | **291** | **780** | **37.3%** |

# STUDY III

**Designing a national curriculum to advance surgical oncology in Mozambique: A 2 Delphi Consensus Study**

**Purpose:** Mozambique is currently experiencing an increase in chronic diseases including cancer. There is a large unmet need for cancer surgery in Mozambique. The aim of this study was to define the content and the design of a training program for practicing surgeons in surgical oncology that would be consensually regarded as adequate to care for oncological patients requiring surgical interventions.

**facsimile of the article only for thesis purpose**

ORIGINAL REPORTS

# Designing a National Curriculum to Advance Surgical Oncology in Mozambique: A Delphi Consensus Study

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**OBJECTIVE:** Mozambique is currently experiencing an increase in chronic diseases including cancer. There is a large unmet need for cancer surgery in Mozambique. The aim of this study was to define the content and the design of a training program for practicing surgeons in surgical oncology that would be consensually regarded as adequate to care for oncological patients requiring surgical interventions.

**DESIGN & SETTING:** A 3-round modified-Delphi approach was implemented to obtain consensus on surgical oncology training curriculum. The participants were purposefully selected experts in surgical oncology working in Mozambique. In round 1, participants answered a questionnaire with open-ended questions regarding the content of the curriculum and the timing and venue of training. In round 2, answers from the first round were presented to a purposeful selected sample of nationally recognized experts in oncology and surgical oncology, including members of the Mozambican College of Surgeons and leadership of the Ministry of Health. A final round was carried out to discuss the draft version of the training program aiming to achieve a predetermined consensus level of 80%.

**PARTICIPANTS:** Fifteen of 23 experts (65.2%) responded to round one.The response rate for round 1 and 3 was 80% (12 of the 15 participants in round one).

**RESULTS:** The responses collected in the first round were analyzed and revealed that basic principles of oncology and basic principles of surgical oncology should be included in the curriculum of surgical residency in Mozambique (80% of the experts agree; Cronbach $\alpha = 0.93$); a 24-months fellowship in surgical oncology should take place after residency in the surgical field (86.6% of experts agree; Cronbach $\alpha = 0.97$); and should occur at Maputo Central Hospital and at comprehensive cancer centers abroad (100% agree). In round 2 the proposal for the program of surgical oncology fellowship obtained a strong agreement amongst the experts

This investigation had no financial support.

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(97.3%). The final proposal for the program was divided into the following structure: (1) theoretical components; (2) duration; (3) location; (4) methodology; (5) technical skills in oncology; and (6) competency and paid particular attention to the oncological diseases prevalent in Mozambique. The agreement amongst the experts was 97.3%.

**CONCLUSIONS:** The experts reached a consensus regarding the general structure for a cancer surgery postgraduate training program in Mozambique, which should be a 24-months fellowship after residency in surgical disciplines. This fellowship should mostly take place in Mozambique, but it should also include dedicated internships in recognized cancer hospitals abroad. Such curricula embrace the Global Curriculum in Surgical Oncology including in particular the oncological nosology of Mozambique and should advance the quality of oncology surgical care provided in the country. (J Surg Ed 000:1–8. © 2020 Published by Elsevier Inc. on behalf of Association of Program Directors in Surgery.)

**KEY WORDS:** surgical oncology, curriculum, Mozambique, training, Delphi method

**COMPETENCIES:** Patient Care, Medical Knowledge, Practice-Based Learning and Improvement

## BACKGROUND

The epidemiological profile in Africa is changing. Amidst a persistently high burden of communicable diseases, chronic noncommunicable diseases are increasing.[1] Cancer incidence and mortality are also growing rapidly in sub-Saharan Africa[2] where access to safe, effective and timely surgery is extremely limited.[3] Most patients in sub-Saharan Africa present with advanced-stage disease. Furthermore, most sub-Saharan African low-income countries lack surgeons or hospitals adequately equipped to care for oncological patients.[4]

Mozambique is currently experiencing an increase in cancer and other chronic diseases.[5] As the country was not prepared for this epidemiological transition, the treatment of cancer patients is potentially suboptimal and there is referral for oncology care abroad.[6] These circumstances emphasize the importance of rapidly upscaling the preparedness of the country's healthcare system in surgical oncology. In this regard, health authorities and universities have improved services within existing capacity, but there are unmet needs in terms of human resources, material resources and knowledge to deal with the increase of cancer diseases.

In Mozambique, patients with suspected diagnosis of a cancerous condition are referred to secondary or tertiary hospitals where diagnosis is confirmed and, if possible, treatment is implemented. Maputo Central Hospital (MCH) is the only hospital equipped with oncology ward and clinical and surgical capacity to care to a certain extent for patients with oncological conditions and also to provide palliative care. Oncological conditions requiring complex treatments such as radiotherapy and complex chemotherapy are referred abroad (for example, to the Republic of South Africa, India, or Portugal depending on existing agreements). MCH is the referral center for complex surgical care in Mozambique including surgical oncology. With 1,500 beds, MCH provides a complete emergency service with advanced diagnostic capacities, inpatient wards for complex medical and surgical care, 3 fully equipped operating rooms and delivery room, 3 recovery rooms, an intensive-care unit, 2 high dependency care units and rehabilitation therapy facilities. MCH is also the country's most important postgraduate medical training center for resident doctors.[7] The uniqueness of this Hospital in the national health system makes it a key player and an important context to study the evolution of oncological care in Mozambique.

In 2018, we studied barriers and suggested solutions to the implementation of best practices for cancer surgery at MCH.[8] Our study identified the prevalent surgical cancers – esophagus, colorectal and breast – and concluded that there were deficits in resident's surgical oncology knowledge.[8] There are currently no formally specialized surgeons in oncology. The introduction of medical treatment and surgical care protocols at MCH relies frequently on the aid of international experts, due to the inexistence of formally trained surgical oncologists in the institution. In Mozambique, currently, the undergraduate training in oncology is fragmented and, at the postgraduate level, there is limited and occasional exposure of medical and surgical residents to oncological conditions. As there are yet in the structured curriculum or formal specific oncology residency programs, training needs to proceed abroad. Unfortunately, only 5 Mozambican Oncologists returned to the country after being trained abroad.The enhancement of postgraduate training in surgical oncology is needed to overcome the pitfalls of cancer surgery in Mozambique. In accordance, there have been successive internationally sponsored interventions to train Mozambique oncologists involving Brazilian hospitals, the Calouste Gulbenkian Foundation in Portugal and the Portuguese Institute of Oncology, MD Anderson Cancer Center from US and others in the last 4 years. The models include training of Mozambican surgeons in these hospitals or on-the-job training in Mozambique with international visiting mentors. So far, these models have had little impact on the practice of surgical oncology in Mozambique.[7-9]

The ability to develop a sustainably adequate surgical oncology workforce depends on the presence of robust educational systems that provide training in all oncologic domains and help maintain competency for those in clinical practice.[10] According to the European Union of Medical Specialists (UEMS), surgical oncologists are oncologists who also possess the expertise to perform operative procedures and interventions. As such, they are specialists that are expected to possess the required knowledge of basic principles and tenets of multidisciplinary cancer management: epidemiology, screening, diagnostic pathology, medical imaging, chemotherapy and radiation therapy, palliative care, interventional radiology and endoscopy.[11] Therefore, the development of an official and formal surgical oncology residency or fellowship holds great potential to in delivering an impressive and lasting impact on oncology surgery in Mozambique, since the transmission of knowledge is based on continued practice in an organized manner, it is not episodic and allows training of generations of surgical oncologists.

The goal of this study was to develop a fellowship curriculum (24-months) though a consensus methodology, suitable to be implemented by the Mozambican College of Surgeons regardless of clinical training and practice site. The impetus for the study was that the provision of educational leaders with such a curriculum would induce educational change, create coherent practical surgical training opportunities and ultimately minimize the gaps in surgical oncology of fellows. To achieve this aim the Delphi consensus methodology was implemented in order to develop expert consensus regarding the key program required to graduate Mozambican surgical oncologists.

## METHODOLOGY

### Study Design

To reach consensus on the surgical oncology fellowship curriculum, we used a modified Delphi method to develop a consensual definition of the core surgical oncology competencies (knowledge, skills, and attitudes) for surgery residents and young surgeons in Mozambique. The Delphi process is a systematic technique to collect and transform individual expert opinions in a group consensus, through multiple rounds of surveys.[12] This methodology has been used widely in health-related research including surgical education research.[13] The Delphi method avoids the possibility that the highest positioned expert is the most influential in reaching consensus and, secondly, prevents that an expert will adjust to the group opinion regardless of the evidence that supports his/her own opinions.[14]

*Participant Selection for the Delphi Consensus*

Twenty-three individuals (surgeons, medical oncologists, radio-oncologists, pathologists from Mozambique Central Hospitals; members of the Mozambican College of Surgery; and the Ministry of Health) with expertise in oncology care, surgery or health policy were purposefully invited to participate in this study. These experts were chosen because of their extensive experience with Mozambican healthcare context and national leadership role in academic surgery and oncology, their potential to influence and implement education changes at their institutions and their ability to influence policy and practice within the Ministry of Health in Mozambique. A 3-person steering group (SG) was formed to guide the process consisting of experienced surgical oncologists (AM, DB, LLS, 2 of whom working in a comprehensive cancer center). The SG did not participate in the expert panel.

*Questionnaire Development and Implementation*

A 3-round modified Delphi process was conducted between February and November 2019, in order to reach consensus among experts on issues related to the design a Mozambican surgical oncology fellowship curriculum. The SG was responsible for organizing the questionnaires and conducting the study. The Delphi structure for data collection and analysis is presented in Figure 1.

A questionnaire was created covering the global surgical oncology training curriculum items and formed the basis of the Delphi survey. The items were measured on a 5-point Likert scale (1 - "strongly disagree" and 5 - "strongly agree"). The SG contacted potential participants by email to ensure interest and agreement to participate in the project. Reminder invitations were sent twice. Participation in the panel was voluntary. The process was conducted in a "quasi" anonymous manner. Respondents' identity was only known by the SG to allow reminders and provide feedback in subsequent rounds. The participants' judgments and opinions remained strictly anonymous to members of the expert panel.

### Round One

The items presented in round one were:

1- Regarding the preparation of Mozambican surgeons in surgical oncology what oncologic items do you think surgical residents and young surgeons should be knowledgeable about and masters of?

A. Basic principles of oncology,
B. Basic principles of surgical oncology,
C. National oncological program,
D. Disease site specific oncology surgical treatment of dominant oncological pathologies in the country (themes are not mutually exclusive).

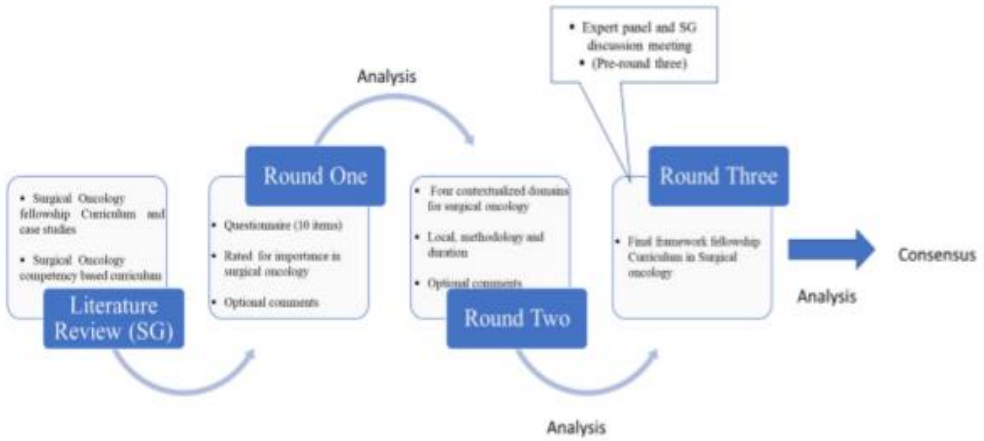


**FIGURE 1.** Delphi study structure for data collection and analysis. Building a surgical oncology fellowship curriculum with a three round modified survey. SG, Steering group).

2- At what time should the surgical oncology fellowship take place?

A. During of residence,
B. End of residence,
C. After residence

3- Where should this surgical oncology fellowship take place and with whom?

A. MCH,
B. Abroad,
C. Combining the 2 locations but mostly in the country.

The results were analyzed by the SG, and a second questionnaire was constructed including the important items obtained in this round.

### Round Two

For the second round, the SG used the information provided by the experts and a curriculum proposal was built (Table 1). Experts were asked if they agreed or not with the proposal and a consensus ≥80% was reached.

### Round Three

The results of the last 2 rounds were presented, and the final proposal (Table 2) was discussed with the expert panel in the consensus session held at the African Organization for Research and Training in Cancer meeting, in Maputo on November 2019. In order to provide educational leaders, with a framework to develop competency and milestones, create didactic, and build practical surgical opportunities to minimize gaps in surgical oncology in Mozambique, the proposal, presented by the SG, also included the following items: knowledge and attitudes in oncology, duration, location and methodology for its implementation and technical. The SG provided additional information that supports the final proposal in the meeting, namely: the Global Curriculum in Surgical Oncology, the European Society of Surgical Oncology Core Curriculum and the Surgical Oncology Competency Based Curriculum Goals and Objectives that was profiled by the experts was those adopted at the General Surgery Residency at East Carolina University.[15-17] One of the most important aspects of the meeting was to give an additional weight in the curriculum to the dominant oncological pathology in Mozambique and to adapt the training taking into account the existing diagnostic and treatment resources according to the philosophy to maintain good practices according to the existing resources.[18]

After the meeting, the participants were requested to only answer anonymously whether they agreed with the final proposal program or not. Consensus on this round was established when agreement with the program was ≥80%.

### Data Analysis

Statistical analysis was performed with SPSS 24. The responses of each round were ranked, and their frequency evaluated. For the Delphi questionnaire (round 1) a measure of internal consistency (Cronbach's alpha) was calculated.

## RESULTS

### Mozambican Surgical Oncology Delphi

Of the 23 experts contacted, 15 (65.2%) participated in the Mozambican surgical oncology Delphi (round 1) The

**TABLE 1.** Final Proposal for the Mozambican Core of Surgical Oncology Fellowship Curriculum

| Components (Agree %) | Location (Agree %) | Methodology (Agree %) | Duration (Agree %) |
|---|---|---|---|
| Basic principles of oncology<br>Carcinogenesis<br>Epidemiology of cancer<br>The profile of cancer diseases in Mozambique<br>Cancer prevention<br>Radiation biology<br>Principles of chemotherapy and target therapy<br>Paliative care<br>Clinical trials<br>Communications skills | Mozambique | Theoretical | During the first 6 months of fellowship |
| **91.6%**<br>*Generic clinical skills*<br>Radiology interpretation<br>Preoperative assessment and prehabilitation<br>Perioperative care<br>Postoperative care and rehabilitation<br>The role of the MDT | **91.6%**<br>Mozambique | **83.3%**<br>Theoretical and Practice | **83.3%**<br>During the first 6 months of fellowship |
| **83.3%**<br>Disease site specific oncology*<br>Breast cancer<br>Colorectal cancer<br>Upper gastrointestinal cancer (Esophageal, Gastric, GIST, Small Bowel)<br>Thoracic cancer<br>Hepatopancreatobiliary cancer<br>Skin cancer and Melanoma<br>Urological malignancies<br>Endocrine malignancies (thyroid, parathyroid, adrenal and pancreatic endocrine)<br>Sarcomas<br>Gynaecological malignancies<br>Peritoneal surface malignancies<br>Surgical aspects of HIV-associated malignancies | **100%**<br>Mozambique and abroad | **100%**<br>Theoretical and Practice | **83.3%**<br>During the next 17 months of fellowship |
| **100%**<br>*Examination in surgical oncology*<br>**100%** | **100%**<br>Mozambique<br>**100%** | **100%**<br>Theoretical and Practice<br>**91.6%** | **91.6%**<br>In the last month of fellowship<br>**100%** |

MDT, multidisciplinary team; GIST, gastrointestinal stromal tumor; HIV, human immunodeficiency virus.
*The surgical oncology fellows should receive direct operative training by experienced and accredited trainers in minor, intermediate, major and complex major surgery as their experience progresses.

response rate for round 2 and 3 was 80% (12 of the 15 participants in round 1).

After the first round data was analyzed and revealed that basic principles of oncology and basic principles of surgical oncology should be included in the curriculum of surgical residency in Mozambique (80% of the experts agree; Cronbach's $\alpha = 0.93$); a 24-months fellowship in surgical oncology should take place after residency in the surgical field (86.6% of experts agree; Cronbach's $\alpha = 0.97$); and should occur at MCH and at comprehensive cancer centers abroad (100% agree). In Round two the proposal for the program of surgical oncology

**TABLE 2.** Final Proposal for Mozambican Core of Surgical Oncology Fellowship Curriculum

| **Component** | **Location** | **Methodology** | **Duration** |
|---|---|---|---|
| **Generic clinical skills** | **Mozambique** | **Theoretical and Practice** | **During the first 3 months of fellowship** |
| Competencies | Know how to interpret CT scans of head, chest, and abdomen, other radiographic studies, mammograms, laboratory values including tumor markers.<br>Have a working knowledge of evaluating a surgical oncology patient. Know indications to obtain studies and utilize these studies when evaluating a patient.<br>Be able to complete a comprehensive history and physical for a surgical oncology patient.<br>Be able to do appropriate pre and postoperative care for a surgical oncology patient.<br>Management of: 1. Daily surgical care 2. Organization of teaching conferences and rounds.<br>Make daily management decisions.<br>Organize and direct resuscitation of critically ill postoperative surgical oncology patients.<br>Fellows will understand and adopt available clinical practice guidelines and recognize the limitations of these guidelines. They will work with patient care managers, discharge coordinators and social workers to coordinate and improve patient care and outcomes. | | |
| (Agree %) | 83.3% | | |
| Basic principles of oncology | Mozambique | Theoretical | During the second 3 months of fellowship |
| Competencies | Understand tumor kinetics including biology of tumor growth and some therapeutic regimens including chemotherapy, radiotherapy, immunotherapy.<br>Understand the basic principles of surgical therapy for cancer.<br>Be able to outline a basic treatment strategy for treatment of common types of cancer based upon stage. This should be both surgical and chemotherapy if indicated.<br>Be able to outline a unified plan of care for common cancers based upon stage, type of cancer, location and potential for resection.<br>Know the principles and approach to common cancers including a detailed understanding of the surgical approach.<br>Have a basic understanding of common cancers, i.e. breast, soft tissue, hepatobiliary, pancreatic, and gastro-intestinal. | | |
| (Agree %) | 91.6% | | |
| Disease site specific oncology | Mozambique and abroad | Theoretical and Practice | During the next 17 months of fellowship |
| Competencies | Have a working knowledge of anatomy and how surgical resection for tumors is influenced by the stage of cancer and the location of the cancer.<br>Be able to perform the following operative procedures: 1. Breast biopsy 2. Perform a sentinel node biopsy 3. Mediport (portacath) placement and removal.<br>Be able to perform the following procedures: 1. Mastectomies 2. Colonic resection 3. Gastric resection.<br>Deal with complex surgical problems in the surgical oncology patient.<br>Deal with the oncological diseases prevalent in Mozambique that require surgical treatment.<br>Will assume major responsibility on the service and have achieved complex technical skills required for the management of: 1. Major complex gastrointestinal surgery 2. Hepatic resection 3. Major cancer resections 4. Pancreatic operations.<br>Assigning resident staff to operative procedures.<br>Deal with complex surgical problems in the surgical oncology patient.<br>They will strive to create ethically sound relationships with patients, the physician team, the care team and the supporting hospital personnel.<br>They will effectively communicate through accurate and complete notes on the electronic medical record. They will exhibit listening skills appropriate to patient-centered interviewing and communication. Fellows will be able to communicate with patients concerning end-of life decisions.<br>All fellows will demonstrate integrity, accountability, respect, compassion, patient advocacy, and dedication to patient care that super cedes self-interest. Fellows will demonstrate a commitment to excellence and continuous professional development.<br>Fellows will be sensitive to health care costs while striving to provide quality care. They will begin to understand the place of appropriate consultation for the best care of their patients.<br>Teaching medical students and junior residents<br>Organizing conferences | | |
| (Agree %) | 100% | | |
| Examination in surgical oncology | Mozambique | Theoretical and Practice | In the last month of fellowship |
| (Agree %) | 100% | | |

fellowship obtained a strong agreement amongst the experts (97.3%). The final proposal for the program was divided into the following structure: (1) theoretical components; (2) duration; (3) location; (4) methodology; (5) technical skills in oncology; and (6) competency. The agreement amongst the experts was 97.3%.

## DISCUSSION

The aim of this study was to design a curriculum for the Mozambican fellowship in surgical oncology, using the Delphi methodology. The resulting curriculum represents consensus of experts in oncology including surgical oncology from MCH, Ministry of health and Mozambican College of Surgery. To our knowledge this is the first study that uses the Delphi method for this purpose in Africa.

The percentage of response rates in all three rounds were high, affirming support and adding credibility to our results.

The inclusion of Good Clinical Practice experiences and the experience of other African countries has been taken into account. Thus, Schweitzer RC et al. recommendations regarding the Essential Elements of Surgical Oncology Training, other curricular experiences in surgical oncology and the experience of Malawi supported the final curriculum propose and ensuring their quality and effectiveness.[15-17, 19,20]

A consensus for a 24-months surgical oncology fellowship that will take place in Mozambique with participation of cancer surgeons experienced in Mozambique activities, internship periods at volume referral cancer centers abroad and the creation of a functional surgical oncology unit in the department of surgery of the MCH was achieved during AORTIC meeting consensus session. In this context, a surgical oncology unit was organized at the MCH.[8]

The least consensual aspect was the importance given, in the second round, in the training curriculum to the treatment of prevalent malignant tumors in Mozambique. The operative rate, in Mozambique, is deficient across all cancer types, including common cancers (breast/cervical/prostate/colorectal/esophagus). Cancer is becoming more prevalent in Mozambique, and there is an increase in new types and body locations, therefore, cancer-specific surgical capacity must be increased to meet all these new needs. This vision was included in the final proposal that achieved high consensus. A similar situation occurs in Ghana, so a Benchmarking Global Surgical Oncology study was carried out defining the unmet need for cancer surgery.[21]

The expert panel also took into account that optimal delivery of cancer therapy requires coordination across disciplines; therefore interdisciplinary training for cancer specialists was considered.[22] At the MCH therapeutic decisions are already multidisciplinary for breast, esophagus, head and neck, colorectal cancer and urogynecological tumors.[23]

Finally, the training program in surgical oncology (fellowship) designed throughout this Delphi process was submitted to the Mozambican College of Surgery for approval. This program was approved and is expected to start in 2021.

## CONCLUSIONS

The training in cancer surgery in Mozambique, according to the local experts' consensus, will be based on a 24-months fellowship after residency in surgical disciplines. The curriculum embraces the Global Curriculum in Surgical Oncology and the local epidemiological, prevalent oncological diseases, resources and developmental characteristics. It will mostly take place in Mozambique but also includes dedicated internships in comprehensive and recognized cancer hospitals. The Delphi methodology was crucial to determine this consensus.

## ACKNOWLEDGMENTS

We thank everyone who accepted to answer the questionnaires and be part of the panel of experts.

## AUTHORS' CONTRIBUTIONS

This study was conceptualized, designed and written by Atílio Morais and Lúcio Lara Santos. Atílio Morais, Donzília Brito and Lúcio Lara Santos formed the Steering Group. Acquisition of data was carried out by Atílio Morais, Manuel Simão, Adriano Tivane, Matchecane Cossa, Jotamo Come, Carlos Selemane, Satish Túlsidas Cesaltina Lorenzoni. Analysis and interpretation of data were done by Jessica Rodrigues, Luis Antunes and Lúcio Lara Santos, Manuel João Costa, Maria Rosário O. Martins, Moshin Sidat and Lúcio Lara Santos revised the article for important intellectual content. All authors read and agreed to the final version of this manuscript. Atílio Morais and Lúcio Lara Santos equally contributed to this study.

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# CHAPTER III

# GENERAL DISCUSSION AND CONCLUSIONS

The epidemiological data for Mozambique show an African country that lives despite its scarce resources, a demographic, epidemiological, nutritional and lifestyle transition.

Despite years of armed conflict that has consumed lives and resources, natural catastrophes, and a fragile economy, the country has organized and created conditions to overcome adversity.

An example of this effort is the number of students reaching university education and the increase in life expectancy. An illustrative document of these statements is the work done by Finn Tarp titled: *Facing the Development Challenge in Mozambique: An Economywide Perspective* (22), and the study by Mouzinho Mário, Peter Fry, Lisbeth Levey and Arlindo Chilundo (23) named *Higher Education in Mozambique: A Case Study*.

Regarding life expectancy we see that it is increasing steadily and the percentage of annual variation is decreasing so an increase in population aging is expected (1).

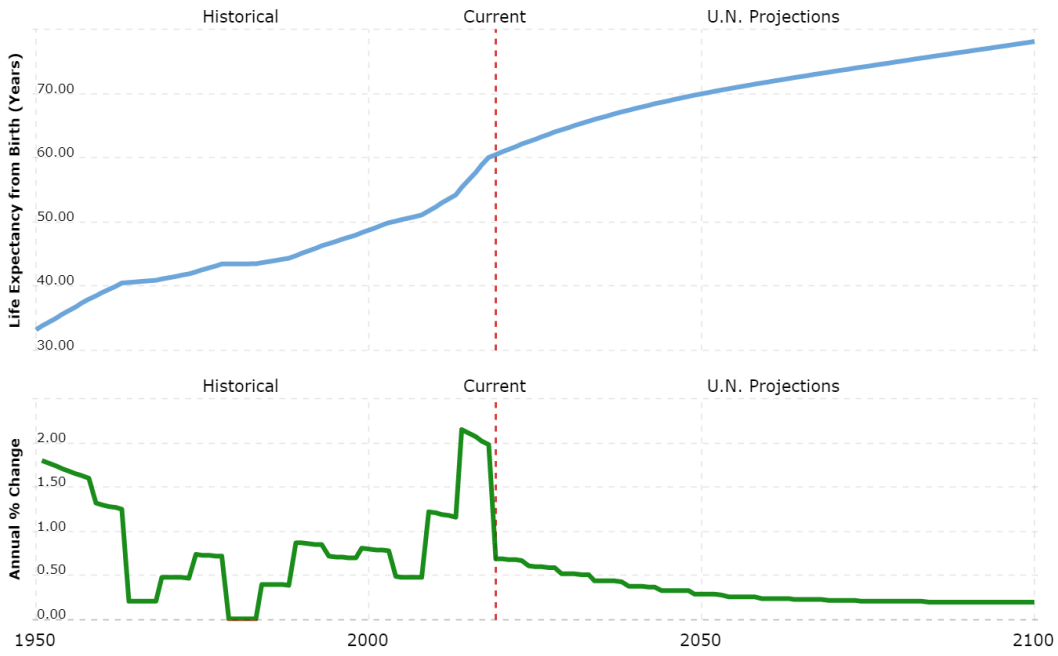


Fig 13 – Variation in life expectancy - https://www.worldometers.info/world-population/mozambique-population/

The conditions are in place for an increase in chronic diseases, including cancer. It is crucial currently when the number of cases is manageable to create the conditions to meet the challenge. It is not just about worrying about material resources and infrastructure. The most relevant challenge will be the formation of competent staff who know how to effectively manage the Mozambican cancer challenge. The path taken has been relevant. The population-based cancer registries of Beira and Maputo, the cancer units in the central hospitals of Maputo, Beira and Nampula, the radiotherapy service of Maputo and the pathological service of the central hospital of Maputo have all been milestones. Recently Mozambique's cancer control plan has been another breakthrough (8). However, the training of surgical oncologists is an unmet need.

**Surgical Oncology**

The definition we adopted for a surgical oncologist was described by UEMS (24). Thus a surgical oncologist *is an oncologist who also possesses the expertise to perform operative procedures and interventions. As such, he is expected to possess the required knowledge of the basic principles and tenets of multi-disciplinary cancer management: epidemiology, screening, diagnostic pathology, medical imaging, chemotherapy and radiation therapy, palliative care, interventional radiology, and endoscopy. Knowledge of the principles of basic, translational, and clinical research are also required.*

The surgical oncologist should be technically proficient in the art, science and principles of surgical procedures and there is an inevitable requirement for a degree of experiential learning to acquire practical skills.

**What are the different ways to train surgical oncologists?**

According Are C et al. the ability to develop a sustainably adequate surgical oncology workforce depends on the presence of robust educational systems that promote training in all oncologic domains and also help in maintaining competency for those in clinical practice (20).

Several forms have been tested to form surgical oncologists. From introducing in the general surgery curriculum oncology disciplines and the obligation to perform a certain

number of oncologic surgeries to an independent specialty of surgical oncology. The first is the one practiced in Portugal but we will have to consider that the number of cancer cases is high (Age standard ratio -w is 300 new cases / 100,000 inhabitants). Which means that much of the surgery done is cancer with the residents of surgery. On the other hand, the undergraduate degree already covers basic oncology in its curriculum.

In Brazil there is an independent specialty of surgical oncology (25). The training of this professional takes a long time. There are six years of medical school, two more years of residency in general surgery and three years of cancer surgery, and in the third year the surgeon usually goes to a specific area, such as head and neck, breast or digestive tract (figure 14).

| Areas | Level 1 | Level 2 | Level 3 | Level 4 |
|---|---|---|---|---|
| 1. Breast | 1. Lumpectomies<br>1. Biopsies | 1. Breast sector resection (segmentectomy, quadrantectomies)<br>2. Simple mastectomy | 1. Breast sector resection with axillary lymphadenectomy<br>2. Oncoplastic surgery with axillary lymphadenectomy<br>3. Radical mastectomy | 1. Mastectomy with immediate reconstruction (skin-sparing or other technique)<br>2. Rescue in major locoregional breast cancer recurrence |
| 2. Head and neck | 1. Nasofibroscopy<br>2. Diagnostic/treatment biopsies<br>3. Tracheostomies<br>4. Thyroidectomy<br>5. Partial glossectomy | 1. Simple resection of mouth tumor<br>2. Simple resection of lip tumor | 1. Thyroidectomy with or without drainage<br>2. Parotidectomy<br>3. Rescue surgery<br>4. Simple reconstructions<br>5. Neck drainage | 1. Mandibulectomy<br>2. Total and partial laryngectomies<br>3. Rescue surgeries (relapse) |
| 3. Chest | 1. Chest drainage<br>2. Pleurodesis<br>3. Biopsies | 1. Pleuroscopy<br>2. Video-assisted thoracoscopic diagnosis<br>3. Diagnostic mediastinoscopy<br>4. Thoracotomy with or without reconstruction | 1. Open wedge/nodulectomy<br>2. Segmental lobectomy | 1. Radical lobectomies<br>2. Pneumectomy with lymphadenectomy<br>3. Tracheoplasty<br>4. Resections of mediastinal tumors |
| 4.Digestive system | 1. Palliative surgery (gastrostomy, gastroenterostomy, jejunostomy)<br>2. Ileostomy closure<br>3. Resection of lesions in the anal canal | 1. Partial, total, and subtotal gastrectomy<br>2. Biliary derivations<br>3. Wedge liver resection<br>4. Open body-tail pancreatectomy<br>5. Palliative surgeries (colon, rectum, anus)<br>6. Oncological emergencies<br>7. Colectomies<br>8. Low anterior resection | 1. Esophagectomies<br>2. Laparoscopic subtotal gastrectomy<br>3. Duodenal pancreatectomy<br>4. Segmental liver resections<br>5. Right and left hepatectomies<br>6. Wedge liver resection<br>7. Abdominoperineal amputation<br>8. - Retroperitoneal tumor resections | 1. Transpositions<br>2. Esophagectomy with or without thoracotomy<br>3. Multiorgan resections<br>4. Laparoscopic esophageal procedures, total gastrectomy<br>5. Minimal invasive procedures<br>6. Cytoreductive surgery+HIPEC<br>7. Retroperitoneal tumor Resections with vascular or multivisceral resection |
| 5.Female reproductive system | 1. Colposcopy<br>2. Classical conization and high-frequency surgery<br>3. Uterine curettage<br>4. Diagnostic laparoscopy<br>5. Abdominal salpingo-oophorectomy | 1. Hysterectomy<br>2. Pelvic lymphadenectomy<br>3. Retroperitoneal lymphadenectomy<br>4. Partial vulvectomy<br>5. Colpectomy<br>6. Ovarian tumor staging surgery | 1. Sentinel lymph node protocol<br>2. Radical vulvectomy<br>3. Inguinofemoral lymphadenectomy<br>4. Ovarian tumor cytoreduction | 1. Pelvic exenteration<br>2. Laparoscopic hysterectomy<br>3. Laparoscopic pelvic lymphadenectomy<br>4. Laparoscopic retroperitoneal lymphadenectomy |
| 6.Male genitourinary system | 1. Bilateral total or subcapsular orchiectomy,<br>2. Resection of penile lesions for diagnosis or therapy | 1. Diagnostic cystoscopy<br>2. Partial cystectomy<br>3. Partial/total penis amputations | 1. Radical prostatectomy<br>2. Radical cystoprostatectomy<br>3. Emasculation<br>4. Pelvic lymphadenectomy<br>5. Partial/radical nephrectomies | 1. Anterior pelvic exenterations<br>2. Urinary leads and reconstructions<br>3. Retroperitoneal lymphadenectomies<br>4. Video laparoscopic partial/radical nephrectomies |

Fig 14 - Surgical procedures to be acquired during the internship of surgical oncology specialty in Brazil - Spencer RMSSB et al. Challenges in surgical oncology training in Brazil: From history to a board-certified specialization. *J Surg Oncol*. 2020;121(5):707-717. doi:10.1002/jso.25850

But in most western countries the formula is the fellowship in surgical oncology that occurs after training in general surgery.

For example, in USA the Complex General Surgical Oncology Fellowship program (26) includes 20 months of clinical rotations and four months of translational research. The clinical portion of the program is heavily weighted toward the strengths of the institution, focusing on complex gastrointestinal malignancies, pancreatic and hepatobiliary malignancies, breast cancer, melanoma, head and neck cancer, bone and soft-tissue sarcoma and foregut malignancies. In addition, trainees will rotate on gynaecologic oncology, medical oncology, radiation oncology, surgical pathology, and interventional radiology, with exposure to chemoembolization and radiofrequency ablation. The program emphasizes coordinated multidisciplinary care which allows the trainee to be involved in all aspects of patient management.

The core curriculum includes weekly surgical grand rounds, didactic sessions in surgical oncology, specialty/tumour-specific meetings and conferences, and clinical research. New patients are presented at multidisciplinary tumour boards where pathology slides and images are reviewed with multiple attending physicians for discussion of multidisciplinary care. Applicants for the CGSO fellowship must meet successful completion of an ACGME-accredited general surgery residency program.

**Surgical oncology education in Africa**

According Wiafe B.A. et al. a lack of resources including an inadequate workforce, with a poor infrastructure including limited lab and diagnostic procedure access as well of lack of appropriate surgical training, surgical instruments and equipment has been linked to poor outcomes and low survival rates in patients with cancer (27). There is need for creating programs and platforms that provide clinical and technical skills on cancer, but also knowledge of tumour biology, carcinogenesis, epidemiology, tumour markers, and tumor pathology, potential complications of multimodality therapy, knowledge of the benefits and associated risks, knowledge in palliative care techniques, education and research (11). It may be difficult and expensive going for formal surgical oncology fellowships abroad, but this can be done locally through short trainings, web-based seminars, conferences and workshops, as well as partnering with well established surgical oncology departments

or associations, in order to build sustainable programs and continuous knowledge (27). Radical solutions are urgently needed, and this needs the commitment of governments and non-governmental organizations. Although this topic was discussed at the last AORTIC congress in Maputo (2019), we found that each African country has different training models and intend to create a consensus to increase a recognized and competent surgical oncology training program, but it has not yet been achieved.

### The model we defend for Mozambique

As we already mentioned in Mozambique, surgery remains the only loco-regional treatment and represents the best hope for the cure, thus a careful evaluation of surgical team skills is critical to improving cancer management (7, 10, 13, 18).

A consensus for a 24-months surgical oncology fellowship that will take place in Mozambique with participation of cancer surgeons experienced in Mozambique activities, internship periods at volume referral cancer centers abroad and the creation of a functional surgical oncology unit in the department of surgery of the MCH was achieved (28).

The curriculum embraces the Global Curriculum in Surgical Oncology and the local epidemiological, prevalent oncological diseases, resources and developmental characteristics. It will mostly take place in Mozambique but also includes dedicated internships in comprehensive and recognized cancer hospitals (annex IX).

## Conclusion

After having validated the country's epidemiological characteristics in oncological terms, the existing human and technical resources, the knowledge in oncology held by our specialist interns and testing the teaching methodologies successfully, experts from Mozambique reached a consensus regarding the general structure for a cancer surgery postgraduate training program in Mozambique, which should be a 24-months fellowship after residency in surgical disciplines. This fellowship should mostly take place in Mozambique, but it should also include dedicated internships in recognized cancer hospitals abroad. Such

curriculum embraces the Global Curriculum in Surgical Oncology including in particular the oncological nosology of Mozambique and should advance the quality of oncology surgical care provided in the country. Finally, the training program in surgical oncology (fellowship) designed was submitted to the Mozambican College of Surgery for approval. This program was approved and is expected to start in 2021.

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# ANNEXES

I – IHMT Congress participation

5º CONGRESSO NACIONAL DE MEDICINA TROPICAL

POLÍTICAS E SERVIÇOS DE SAÚDE

10 A 12 ABRIL 2019

Certificado

DE PARTICIPAÇÃO

Certifica-se que

**Atilio Morais**

apresentou no 5º Congresso Nacional de Medicina Tropical a Comunicação Oral *"ORGANIZAÇÃO DA UNIDADE DE ONCOLOGIA CIRÚRGICA DO HOSPITAL CENTRAL DE MAPUTO (HCM)"*, que se realizou de 10 a 12 de Abril de 2019, no Instituto de Higiene e Medicina Tropical, em Lisboa.

## II - The Cancer Units Assessment Checklist for low- or middle-income African countries (Assessment of National Surgical Oncology Capacity) (estudo I)

The purpose of this guideline is to support the imPACT mission expert to assess the capacity and needs of a country in terms of cancer surgery in order to prepare a comprehensive report with an analysis of gaps and technical recommendations to a Ministry of Health. The guideline shall not limit the collection of other relevant information by the expert during the imPACT mission, as and when appropriate.

Some of the information to be filled in the tables presented in the guidelines should be completed by relevant national counterparts well in advance of the mission.

The mission and the comprehensive report on national surgical oncology capacity should also be supported by the study of any relevant materials and publications available.

The current guideline is composed of three sections:

a) **Overview of surgical oncology services at national level**

b) **Availability of surgical oncology resources at national level**

c) **Availability of surgical oncology resources and quality of surgical procedures at institutional level**

## 1. Overview of surgical oncology services at <u>national level</u>

1.1. Description of national institutions with capacity to perform surgical procedures

| Name of institution | Province | Type of institution | Level of specialization | # beds | Population covered | Visited during mission |
|---|---|---|---|---|---|---|
| *Hospital 1* | *Province A* | *Public* | *Tertiary level* | *xxx* | *xxx* | *Yes* |
| *Hospital 2* | *Province B* | *Private* | *Quaternary level* | *xxx* | *xxx* | *No* |
| *Hospital 3* | *Province C* | *Public-private* | *Secondary level* | *xxx* | *xxx* | *Yes* |
| *Hospital 4* | *Province D* | *NGO* | *Secondary level* | *xxx* | *xxx* | *Yes* |
| *(…)* | | | | | | |

1.2. Description of coverage of surgical services

| Province | Population | Catchment area (km²) | # general hospitals (secondary level) | # specialized hospitals (tertiary/ quaternary level) | # beds per population | Average travel distance by car (if services are not available in the province) |
|---|---|---|---|---|---|---|
| *Province A* | *xxx* | *xxx* | *xxx* | *xxx* | *xxx* | *n.a.* |
| *Province B* | *xxx* | *xxx* | *xxx* | *xxx* | *xxx* | *xxx* |
| *Province C* | *xxx* | *xxx* | *xxx* | *xxx* | *xxx* | *n.a.* |
| *Province D* | *xxx* | *xxx* | *xxx* | *xxx* | *xxx* | *n.a.* |
| *(…)* | | | | | | |

1.3. Description of availability and role of relevant health workforce

| Health professional | Academic level | Years of duration (academic degree, training, residency) | Rotation in oncology during studies | # certifying universities/ institutions | # graduates per year | # professionals | |
|---|---|---|---|---|---|---|---|
| | | | | | | public sector | private sector |
| *Nurse* | *BSc* | *xxx* | *Yes/No/n.a.* | *xxx* | *xxx* | *xxx* | *xxx* |
| *Nurse Anaesthetist* | *BSc, CNRA* | *xxx + yyy* | *Yes/No/n.a.* | *xxx* | *xxx* | *xxx* | *xxx* |
| *General practitioner* | *MD* | *xxx* | *Yes/No/n.a.* | *xxx* | *xxx* | *xxx* | *xxx* |
| *Anaesthetist* | *MD, Mmed* | *xxx + yyy* | *Yes/No/n.a.* | *xxx* | *xxx* | *xxx* | *xxx* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Gynaecologist* | *MD, Mmed* | *xxx + yyy* | *Yes/No/n.a.* | xxx | xxx | xxx | xxx |
| *Orthopaedist* | *MD, Mmed* | *xxx + yyy* | *Yes/No/n.a.* | xxx | xxx | xxx | xxx |
| *Urologist* | *MD, Mmed* | *xxx + yyy* | *Yes/No/n.a.* | xxx | xxx | xxx | Xxx |
| *General surgeon* | *MD, Mmed* | *xxx + yyy* | *Yes/No/n.a.* | xxx | xxx | xxx | Xxx |
| *Others as relevant (…)* | | | | | | | |

## 2) Availability of surgical oncology resources at national and at institutional levels

### 2.1. Infrastructure available

| | Yes/No | Total | # public sector | # private sector | # other | Additional comments |
|---|---|---|---|---|---|---|
| *Surgery department/service* | | | | | | |
| *Beds dedicated to patients undergoing surgery* | | | | | | |
| *Operating theatre* | | | | | | |
| *Unit for post-anaesthetic recovery* | | | | | | |
| *Intensive/intermediate care unit* | | | | | | |
| *Sterilization unit* | | | | | | |
| *Storage room of surgical resources within operating theatre* | | | | | | |
| *Central system of medicinal gases* | | | | | | |
| *Pharmacy services within operating theatre* | | | | | | |
| *Hemotherapy department/service* | | | | | | |
| *(…)* | | | | | | |

### 2.2. Workforce available

| | Yes/No | Total | # public sector | # private sector | # other | Additional comments |
|---|---|---|---|---|---|---|
| *General surgeons* | | | | | | |
| *General surgeons with training in oncology* | | | | | | |
| *Gynaecologists* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Orthopaedists* | | | | | | |
| *Urologists* | | | | | | |
| *Surgery residents* | | | | | | |
| *Anaesthesia residents (per year)* | | | | | | |
| *Gynaecology residents (per year)* | | | | | | |
| *Orthopaedics residents (per year)* | | | | | | |
| *Nurses / Operating room technicians* | | | | | | |
| *Nurses / Anaesthetic technician* | | | | | | |
| *Operating room nurses* | | | | | | |
| *Midwifes* | | | | | | |
| *(…)* | | | | | | |

## a) Availability of surgical oncology resources and quality of surgical procedures at institutional level

| **Institution's name (#1)** | | | |
|---|---|---|---|
| **Infrastructure available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *Beds dedicated to patients undergoing surgery* | | | |
| *Operating theatre* | | | |
| *Unit for post-anaesthetic recovery* | | | |
| *Intensive/intermediate care unit* | | | |
| *Sterilization unit* | | | |
| *Storage room of surgical resources within operating theatre* | | | |
| *Central system of medicinal gases* | | | |
| *Pharmacy services within operating theatre* | | | |
| *Hemotherapy department/service* | | | |
| *(…)* | | | |
| **Workforce available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *General surgeons* | | | |
| *General surgeons with training in oncology* | | | |
| *Gynaecologists* | | | |
| *Orthopaedists* | | | |
| *Urologists* | | | |
| *Residency programmes* | | | |
| *Surgery residents (per year)* | | | |
| *Anaesthesia residents (per year)* | | | |
| *Gynaecology residents (per year)* | | | |
| *Orthopaedics residents (per year)* | | | |

| | | | |
|---|---|---|---|
| *Nurses / Operating room technicians* | | | |
| *Nurses / Anaesthetic technician* | | | |
| *Operating room nurses* | | | |
| *Midwifes* | | | |
| *(…)* | | | |

**Assessment of workload, surgical and quality procedures**

***Workload***

| | | **Number or percentage, as applicable** | **Please add description (if applicable)** |
|---|---|---|---|
| *Number of surgeries / year* | | | |
| *Number of cancer surgeries / year* | | | |
| *% of cancer cases that arrive to the hospital without any previous treatment* | | | |
| *Number of referrals made to other medical specialities / hospitals* | | | |
| *% of curative cancer surgeries* | | | |
| *% of palliative cancer surgeries* | | | |
| *% of planned cancer surgeries* | | | |
| *% of emergency cancer surgeries* | | | |
| *Average waiting time between prescription and surgery (in days or weeks)* | | | |
| *Most common cancer sites treated* | | n.a. | n.a. |
| *#1* | *xxx* | | |
| *#2* | *xxx* | | |
| *#3* | *xxx* | | |
| *#4* | *xxx* | | |
| *#5* | *xxx* | | |

***Surgical and quality procedures***

| | **Yes/ No** | **Please add description (if applicable)** |
|---|---|---|
| *Tumour boards* | | |
| *Surgeon is part of tumour boards* | | |
| *Referral system in place to other treatment modalities / locations* | | |
| *Programme to ensure safe surgical procedures* | | |

| | | | |
|---|---|---|---|
| *Programme to control infections* | | | |
| *Programme of surgical risk assessment* | | | |
| *Quality control programme of apparatus and surgical instruments* | | | |
| *Registry of surgical procedures* | | | |
| *Registry of curative and palliative surgeries* | | | |
| *Registry of surgical and anaesthetic complications* | | | |
| *Registry of survival per stages of disease* | | | |
| *Registry of blood transfusions* | | | |
| *Registry of emergency procedures* | | | |
| *Quality indicators* | | n.a. | n.a. |
| | *Survival rate (of key surgical procedure?)* | | |
| | *Mortality rate (of key surgical procedures?)* | | |
| | *Complications rate (of key surgical procedures?)* | | |

| **Institution's name (#2)** | | | |
|---|---|---|---|
| **Infrastructure available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *Beds dedicated to patients undergoing surgery* | | | |
| *Operating theatre* | | | |
| *Unit for post-anaesthetic recovery* | | | |
| *Intensive/intermediate care unit* | | | |
| *Sterilization unit* | | | |
| *Storage room of surgical resources within operating theatre* | | | |
| *Central system of medicinal gases* | | | |
| *Pharmacy services within operating theatre* | | | |
| *Hemotherapy department/service* | | | |
| *(…)* | | | |
| **Workforce available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *General surgeons* | | | |
| *General surgeons with training in oncology* | | | |
| *Gynaecologists* | | | |
| *Orthopaedists* | | | |
| *Urologists* | | | |
| *Residency programmes* | | | |
| *Surgery residents (per year)* | | | |
| *Anaesthesia residents (per year)* | | | |
| *Gynaecology residents (per year)* | | | |
| *Orthopaedics residents (per year)* | | | |
| *Nurses / Operating room technicians* | | | |
| *Nurses / Anaesthetic technician* | | | |

| | | | |
|---|---|---|---|
| *Operating room nurses* | | | |
| *Midwifes* | | | |
| *(…)* | | | |

| **Assessment of workload, surgical and quality procedures** | | | |
|---|---|---|---|
| | ***Workload*** | | |
| | | **Number or percentage, as applicable** | **Please add description (if applicable)** |
| *Number of surgeries / year* | | | |
| *Number of cancer surgeries / year* | | | |
| *% of cancer cases that arrive to the hospital without any previous treatment* | | | |
| *Number of referrals made by the surgery department to other medical specialities / hospitals* | | | |
| *% of curative cancer surgeries* | | | |
| *% of palliative cancer surgeries* | | | |
| *% of planned cancer surgeries* | | | |
| *% of emergency cancer surgeries* | | | |
| *Average waiting time between prescription and surgery (in days or weeks)* | | | |
| *Most common cancer sites treated* | | n.a. | n.a. |
| *#1* | *xxx* | | |
| *#2* | *xxx* | | |
| *#3* | *xxx* | | |
| *#4* | *xxx* | | |
| *#5* | *xxx* | | |
| | ***Surgical and quality procedures*** | | |
| | | **Yes/ No** | **Please add description (if applicable)** |
| *Tumour boards* | | | |
| *Surgeon is part of tumour boards* | | | |
| *Referral system in place to other treatment modalities / locations* | | | |
| *Programme to ensure safe surgical procedures* | | | |
| *Programme to control infections* | | | |
| *Programme of surgical risk assessment* | | | |

| | | | |
|---|---|---|---|
| *Quality control programme of apparatus and surgical instruments* | | | |
| *Registry of surgical procedures* | | | |
| *Registry of curative and palliative surgeries* | | | |
| *Registry of surgical and anaesthetic complications* | | | |
| *Registry of survival per stages of disease* | | | |
| *Registry of blood transfusions* | | | |
| *Registry of emergency procedures* | | | |
| *Quality indicators* | | n.a. | n.a. |
| | *Survival rate (of key surgical procedure?)* | | |
| | *Mortality rate (of key surgical procedures?)* | | |
| | *Complications rate (of key surgical procedures?)* | | |

| **Institution's name (#3)** | | | |
|---|---|---|---|
| **Infrastructure available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *Beds dedicated to patients undergoing surgery* | | | |
| *Operating theatre* | | | |
| *Unit for post-anaesthetic recovery* | | | |
| *Intensive/intermediate care unit* | | | |
| *Sterilization unit* | | | |
| *Storage room of surgical resources within operating theatre* | | | |
| *Central system of medicinal gases* | | | |
| *Pharmacy services within operating theatre* | | | |
| *Hemotherapy department/service* | | | |
| *(…)* | | | |
| **Workforce available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *General surgeons* | | | |
| *General surgeons with training in oncology* | | | |
| *Gynaecologists* | | | |
| *Orthopaedists* | | | |
| *Urologists* | | | |
| *Residency programmes* | | | |
| *Surgery residents (per year)* | | | |
| *Anaesthesia residents (per year)* | | | |
| *Gynaecology residents (per year)* | | | |
| *Orthopaedics residents (per year)* | | | |
| *Nurses / Operating room technicians* | | | |
| *Nurses / Anaesthetic technician* | | | |

| | | | |
|---|---|---|---|
| *Operating room nurses* | | | |
| *Midwifes* | | | |
| *(…)* | | | |

| **Assessment of workload, surgical and quality procedures** | | | |
|---|---|---|---|
| | ***Workload*** | | |
| | | **Number or percentage, as applicable** | **Please add description (if applicable)** |
| *Number of surgeries / year* | | | |
| *Number of cancer surgeries / year* | | | |
| *% of cancer cases that arrive to the hospital without any previous treatment* | | | |
| *Number of referrals made by the surgery department to other medical specialities / hospitals* | | | |
| *% of curative cancer surgeries* | | | |
| *% of palliative cancer surgeries* | | | |
| *% of planned cancer surgeries* | | | |
| *% of emergency cancer surgeries* | | | |
| *Average waiting time between prescription and surgery (in days or weeks)* | | | |
| *Most common cancer sites treated* | | n.a. | n.a. |
| *#1* | *xxx* | | |
| *#2* | *xxx* | | |
| *#3* | *xxx* | | |
| *#4* | *xxx* | | |
| *#5* | *xxx* | | |
| | ***Surgical and quality procedures*** | | |
| | | **Yes/ No** | **Please add description (if applicable)** |
| *Tumour boards* | | | |
| *Surgeon is part of tumour boards* | | | |
| *Referral system in place to other treatment modalities / locations* | | | |
| *Programme to ensure safe surgical procedures* | | | |
| *Programme to control infections* | | | |
| *Programme of surgical risk assessment* | | | |

| | | | |
|---|---|---|---|
| *Quality control programme of apparatus and surgical instruments* | | | |
| *Registry of surgical procedures* | | | |
| *Registry of curative and palliative surgeries* | | | |
| *Registry of surgical and anaesthetic complications* | | | |
| *Registry of survival per stages of disease* | | | |
| *Registry of blood transfusions* | | | |
| *Registry of emergency procedures* | | | |
| *Quality indicators* | | n.a. | n.a. |
| | *Survival rate (of key surgical procedure?)* | | |
| | *Mortality rate (of key surgical procedures?)* | | |
| | *Complications rate (of key surgical procedures?)* | | |

| **Institution's name (#4)** | | | |
|---|---|---|---|
| **Infrastructure available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *Beds dedicated to patients undergoing surgery* | | | |
| *Operating theatre* | | | |
| *Unit for post-anaesthetic recovery* | | | |
| *Intensive/intermediate care unit* | | | |
| *Sterilization unit* | | | |
| *Storage room of surgical resources within operating theatre* | | | |
| *Central system of medicinal gases* | | | |
| *Pharmacy services within operating theatre* | | | |
| *Hemotherapy department/service* | | | |
| *(…)* | | | |
| **Workforce available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *General surgeons* | | | |
| *General surgeons with training in oncology* | | | |
| *Gynaecologists* | | | |
| *Orthopaedists* | | | |
| *Urologists* | | | |
| *Residency programmes* | | | |
| *Surgery residents (per year)* | | | |
| *Anaesthesia residents (per year)* | | | |
| *Gynaecology residents (per year)* | | | |
| *Orthopaedics residents (per year)* | | | |
| *Nurses / Operating room technicians* | | | |
| *Nurses / Anaesthetic technician* | | | |

| | | | |
|---|---|---|---|
| *Operating room nurses* | | | |
| *Midwifes* | | | |
| *(…)* | | | |

| **Assessment of workload, surgical and quality procedures** | | | |
|---|---|---|---|
| | ***Workload*** | | |
| | | **Number or percentage, as applicable** | **Please add description (if applicable)** |
| *Number of surgeries / year* | | | |
| *Number of cancer surgeries / year* | | | |
| *% of cancer cases that arrive to the hospital without any previous treatment* | | | |
| *Number of referrals made by the surgery department to other medical specialities / hospitals* | | | |
| *% of curative cancer surgeries* | | | |
| *% of palliative cancer surgeries* | | | |
| *% of planned cancer surgeries* | | | |
| *% of emergency cancer surgeries* | | | |
| *Average waiting time between prescription and surgery (in days or weeks)* | | | |
| *Most common cancer sites treated* | | n.a. | n.a. |
| *#1* | *xxx* | | |
| *#2* | *xxx* | | |
| *#3* | *xxx* | | |
| *#4* | *xxx* | | |
| *#5* | *xxx* | | |
| | ***Surgical and quality procedures*** | | |
| | | **Yes/ No** | **Please add description (if applicable)** |
| *Tumour boards* | | | |
| *Surgeon is part of tumour boards* | | | |
| *Referral system in place to other treatment modalities / locations* | | | |
| *Programme to ensure safe surgical procedures* | | | |
| *Programme to control infections* | | | |
| *Programme of surgical risk assessment* | | | |

| | | | |
|---|---|---|---|
| *Quality control programme of apparatus and surgical instruments* | | | |
| *Registry of surgical procedures* | | | |
| *Registry of curative and palliative surgeries* | | | |
| *Registry of surgical and anaesthetic complications* | | | |
| *Registry of survival per stages of disease* | | | |
| *Registry of blood transfusions* | | | |
| *Registry of emergency procedures* | | | |
| *Quality indicators* | | n.a. | n.a. |
| | *Survival rate (of key surgical procedure?)* | | |
| | *Mortality rate (of key surgical procedures?)* | | |
| | *Complications rate (of key surgical procedures?)* | | |

| **Institution's name (#5)** | | | |
|---|---|---|---|
| **Infrastructure available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *Beds dedicated to patients undergoing surgery* | | | |
| *Operating theatre* | | | |
| *Unit for post-anaesthetic recovery* | | | |
| *Intensive/intermediate care unit* | | | |
| *Sterilization unit* | | | |
| *Storage room of surgical resources within operating theatre* | | | |
| *Central system of medicinal gases* | | | |
| *Pharmacy services within operating theatre* | | | |
| *Hemotherapy department/service* | | | |
| *(…)* | | | |
| **Workforce available** | | | |
| | **Yes/No** | **Total** | **Additional comments (if applicable)** |
| *General surgeons* | | | |
| *General surgeons with training in oncology* | | | |
| *Gynaecologists* | | | |
| *Orthopaedists* | | | |
| *Urologists* | | | |
| *Residency programmes* | | | |
| *Surgery residents (per year)* | | | |
| *Anaesthesia residents (per year)* | | | |
| *Gynaecology residents (per year)* | | | |
| *Orthopaedics residents (per year)* | | | |
| *Nurses / Operating room technicians* | | | |
| *Nurses / Anaesthetic technician* | | | |

| | | | |
|---|---|---|---|
| *Operating room nurses* | | | |
| *Midwifes* | | | |
| *(…)* | | | |

| **Assessment of workload, surgical and quality procedures** | | | |
|---|---|---|---|
| | ***Workload*** | | |
| | | **Number or percentage, as applicable** | **Please add description (if applicable)** |
| *Number of surgeries / year* | | | |
| *Number of cancer surgeries / year* | | | |
| *% of cancer cases that arrive to the hospital without any previous treatment* | | | |
| *Number of referrals made by the surgery department to other medical specialities / hospitals* | | | |
| *% of curative cancer surgeries* | | | |
| *% of palliative cancer surgeries* | | | |
| *% of planned cancer surgeries* | | | |
| *% of emergency cancer surgeries* | | | |
| *Average waiting time between prescription and surgery (in days or weeks)* | | | |
| *Most common cancer sites treated* | | n.a. | n.a. |
| *#1* | *xxx* | | |
| *#2* | *xxx* | | |
| *#3* | *xxx* | | |
| *#4* | *xxx* | | |
| *#5* | *xxx* | | |
| | ***Surgical and quality procedures*** | | |
| | | **Yes/ No** | **Please add description (if applicable)** |
| *Tumour boards* | | | |
| *Surgeon is part of tumour boards* | | | |
| *Referral system in place to other treatment modalities / locations* | | | |
| *Programme to ensure safe surgical procedures* | | | |
| *Programme to control infections* | | | |
| *Programme of surgical risk assessment* | | | |

| | | | |
|---|---|---|---|
| *Quality control programme of apparatus and surgical instruments* | | | |
| *Registry of surgical procedures* | | | |
| *Registry of curative and palliative surgeries* | | | |
| *Registry of surgical and anaesthetic complications* | | | |
| *Registry of survival per stages of disease* | | | |
| *Registry of blood transfusions* | | | |
| *Registry of emergency procedures* | | | |
| *Quality indicators* | | n.a. | n.a. |
| | *Survival rate (of key surgical procedure?)* | | |
| | *Mortality rate (of key surgical procedures?)* | | |
| | *Complications rate (of key surgical procedures?)* | | |

III – Data sheet "Portuguese-speaking African Countries Assessment of Surgical Oncology Capacity Survey (PSAC-Surgery)", Surgical department, MCH (estudo I)

1 – **Quanto a Política oncológica do País**:

a) existe um plano nacional?

Sim ☐ Não ☐

b) existe programa de cooperação internacional?

Sim ☐ Não ☐

2 – **Referente ao Registro de cancro, existe um registo hospitalar**:

d) baseado em anatomia patológica? ☐

e) baseado no registro populacional? ☐

3 – **Quanto a Acurácia diagnóstica**:

a) existe sistema de auditoria ao diagnóstico?

Sim ☐ Não ☐

4 –**Quanto a Responsabilidade e Tarefas da equipe oncológica**:

a) existe clara definição das tarefas e pápeis dos diferentes recursoshumanos em oncológia?

Sim ☐ Não ☐

5 – **Quanto a Boas práticas**:

b) existem cuidados integrados de oncológia?
Sim ☐ Não ☐

c) existe a selecção de critérios?

Sim ☐ Não ☐

d) Existe registo e avaliação em consulta multidisciplinar em oncológia?

Sim ☐ Não ☐

e) Existem recomendações e guias de orientação?

Sim ☐ Não ☐

6 – **Quanto a processos de Tratamento**:

a) existem instalações e equipamentos para a preparação de drogas (cuidados centralizados) e de infusão, certificadas?

Sim ☐ Não ☐

b) unidades de tratamento cirurgico?

Sim ☐ Não ☐

c) Radioterápia?

Sim ☐ Não ☐

d) – Protocolos escritos para aquisição e preparação de quimioterapia?

Sim ☐ Não ☐

e) – Protocolos de prescrição e administração de quimioterapia?

Sim ☐ Não ☐

f)existe o Hospital dia Oncológico?

Sim ☐ Não ☐

g) existe enfermarias dedicadas a oncológia?

Sim ☐ Não ☐

h) existe protocolos de actuação que assegurem a continuídade dos cuidados e o registo de complicações?

Sim ☐ Não ☐

7 – **Quanto a Salvaguarda da qualidade em todas as áreas**;

a) existem requisitos de segurança e salvaguarda de riscos?

Sim ☐ Não ☐

b) Existeminquéritos de salvaguarda de riscos?

Sim ☐ Não ☐

c) Existem inquéritos de satisfação de clientes?

Sim ☐ Não ☐

b) existe política de controlo periódico?

Sim ☐ Não ☐

c) controlo de lixo tóxico?

Sim ☐ Não ☐

8 – **Quanto aoServiço de suporte aos doentes e familiares**:

a) existe serviço dedicado a reabilitação dos doentes?

Sim ☐ Não ☐

b) existe serviço de controlo da dor?

Sim ☐ Não ☐

c) existe unidades de cuidados paliativos?

Sim ☐ Não ☐

d) existe serviço de psico-oncológia?

Sim ☐ Não ☐

e) existe serviço de patient-navigation?

Sim ☐ Não ☐

f)existe aconselhamento familiar nos cuidados implementados?

Sim ☐ Não ☐

9 – **Quanto ao Ensino, Formação contínua e Investigação ciêntífica oncológica**:

a) existe algum tipo de formação oncológica?

Sim ☐ Não ☐

b) existe participação nesta formação?

Sim ☐ Não ☐

c) existe investigação clínica?

Sim ☐ Não ☐

10 – **Quanto a Remoção de barreiras e Promoção do engajamento de apoiantes**:

a) existe um sistema de identificação de *stakeholders*?

Sim ☐ Não ☐

f) existe um sistema de identificação de barreiras para estabelecimento de unidade de oncologia?

Sim ☐ Não ☐

IV - Ficha de recolha de dados (estudo II)

PROTOCOLO DOENÇAS CIRURGICAS ONCOLÓGICAS NO DEPARTAMENTO DE CIRURGIA, HCM

MAMA, ESÔFAGO E COLORECTAL

Nid:

- Idade (em anos): Data de Nascimento____/___/___ Raça _____

Local de nascimento _____

- Sexo: F__ M__

Data do diagnóstico___/____/___ Local_____

Local do Tumor?_____

Meio (s) de Diagnóstico

:_____

_____

- Estadiamento: T__N___M___: Precoce __ Tardio __

- Histologia (tipo):

- Terapêutica sistémica :Sim __ Não __

Neoadjuvante ____

Adjuvante_____

Paliativa_____

Radioterapia __

Neoadjuvante ____

Adjuvante_____

Paliativa_____

Outros __

- Tratamento cirúrgico: Paliativo __ qual?__

Data da ultima observação:

Vivo sem doença_____

Vivo com doença____

Falecimento? Data____/___/___ Pela doença : Sim ____ Não_____

Cuidados Paliativos? Sim_____não_____

V – Resident knowledge test in basic Oncology (study II)

**I Curso Básico de Oncologia**

**Este teste é anónimo.**

**Epidemiologia**

**1 – Quais são os 5 tumores Malignos mais frequentes em Moçambique?**

**a)**_____

**b)**_____

**c)**_____

**d)**_____

**e)**_____

**Classificação por estádios**

**2 - Das seguintes afirmações assinale as perguntas verdadeiras e as falsas em relação à classificação TNM?**

a) Tx representa o menor tamanho da Lesão -

b) M1determina metastização à distância -

c) N0 representa gânglios sem metastização -

d pTis significa tumor in situ confirmado hisológicamente -

e) Nos tumores Tis há invasão da membrana basal _

**Cancerização**

**3 – Assinale sentenças verdadeiras e as falsas:**

a) Os agentes carcinogénicos são classificados como químicos, físicos e biológicos-

b) O ambiente tem pouco impacto no processo de cancerização -

c) A apoptose é quando as células estão em G0 -

d) As alterações genéticas mais frequentes são mutações pontuais, deleções, translocações e amplificações -

e) Os cancros hereditários são os mais frequentes-

**4– São características da célula cancerosa (assinale a falsa):**

**a**) Aumento de tamanho do núcleo

b) Perda de inibição por contacto

c) Nucléolos evidentes

d) Sobrevivência num meio pobre em nutrientes

e) Proliferação diminuta

**Cirurgia oncológica**

**5 - Uma cirurgia R0 é:**

a) Margens livres macro e microscopicamente

b) Margens livres só macroscopicamente

c) Margens com tumor

d) Remoção de todos os gânglios

e) Remoção das metástases

## Radioterapia

**6 – A radioterapia é um tratamento eficaz contra o cancro. Ela é utilizada em:**

a) < 10% dos doentes oncológicos

b) 10-20% dos doentes oncológicos

c) 30-40% dos doentes oncológicos

d) Entre 50 a 60% dos doentes oncológicos

e) Mais de 60% dos doentes oncológicos

**7 – A radioterapia é utilizada de uma forma isolada ou em associação com a quimioterapia (assinale a verdadeira)**

a) A quimio-radioterapia é a estratégia mais importante e eficaz no tratamento do cancro

b) A radioterapia nunca é usada de uma forma isolada e única no tratamento do cancro

c) A radioterapia ou a quimioterapia são sempre usadas após a cirurgia

d) A quimio-radioterapia pode ser usada como o único tratamento curativo de uma forma isolada sem associação com a cirurgia, em determinadas patologias

e) Todas as anteriores são falsas

## Quimioterapia

**8 – Faça corresponder a letra de cada uma das afirmações seguintes com os tipos de quimioterapia abaixo indicados:**

a. Simultaneamente com a radioterapia
b. Diminuição da massa tumoral antes da cirurgia
c. Após a cirurgia e/ou radioterapia
d. Efeito aumentar a sensibilidade à radioterapia
e. Erradicar micrometástases

Quimioterapia adjuvante: _ _____

Quimioterapia neoadjuvante: ____ _____

Quimioterapia concomitante: ____ _____

Quimioterapia radiosensibilizadora: _____

**9 – Para realizar a quimioterapia é importante conhecer o estado do doente (Performance status), Utilizam-se escalas Assinale as verdadeiras e as falsas:**

**a)** MUST
**b)** ECOG
**c)** POSSUM
**d)** Karnofsky
**e)** Glasgow

**10 - Segundo a OMS a resposta à terapêutica é classificada em (assinale a falsa):**

a)-Remissão completa: desaparecimento da lesão após duas observações imagiológicas separadas por 4 semanas

b)-Remissão parcial: redução de 25% (após duas observações imagiológicas separadas por 4 semanas)

c)-Doença estável: redução <50% ou crescimento <25%

d)-Progressão da Doença: crescimento> 50%

e)- São todas falsas

**11- São vias possíveis de administração da quimioterapia as seguintes para além da endovenosa as seguintes (excepto):**

a)Oral

b)Intravesical

c)Intraperitoneal

d)intraóssea

e)Intratecal

f)Tópica

g)Intrapleural

i)intraarterial

**12 - O tratamento com quimioterapia, realizado em doentes com tumores avançados quando a possibilidade de cura está ultrapassada e efectuado com a finalidade de prolongar a vida e/ou melhorar a sua qualidade, designa-se:**

a) Quimioterapia adjuvante

b) Quimioterapia neo-adjuvante

c) Quimioterapia regional

d) Quimioterapia paliativa

e) Nenhuma das anteriores

**Cancro da Mama**

**13 - Na avaliação da mama devem-se valorizar todas estas alterações excepto:**

a) Nódulos
b) Alterações cutâneas
c) Retracção da pele
d) Tamanho da aréola
e) Escorrência mamilar

**14- A patologia da mama pode manifestar-se por: (excepto)**:

a) Nódulo mamário
b) Mastodinia
c) Escorrência mamilar
d) Alterações menstruais
e) Adenopatias axilares

**15 - Cancro Mama – Faça a correspondência?**

a) ER+; RP+; KI67<20% Her2- _____

b) ER+; RP+; KI67≥20% Her2- _____

c) ER+; RP+; KI67<15% Her2+ _____

d) ER-; RP-; KI67<15% Her2+ _____

e) ER-; RP-; Her2- _____

1- Luminal A; 2- Luminal B; 3- Triplo negativo; 4- Her2+

**16 – Nas intervenções cirúrgicas mais frequentes no tratamento do cancro da mama o que é que se remove cirurgicamente?**

a) Mastectomia radical modificada ___ Remoção total da mama e esvaziamento ganglionar radical

b) Tumorectomia__ remoção do tumor com margem livre de 1 cm_____

c) Tumorectomia e esvaziamento axilar : Remoção tumor com margem livre de 1 cm e esvaziamento axilar radical_

d) Tumorectomia e biopsia do gânglio sentinela___Remoção do tumor com margem livre de 1 cm e biopsia ganglionar

e) Mastectomia total _ Remoção total da mama

**Cancro do esófago**

**17 - Cancro do esófago –: Qual das seguintes sentenças é falsa?**

a) A disfagia é o sintoma mais frequente

b) Está associado a hábitos tabágicos e etílicos

c) No terço inferior do esófago podem ocorrer adenocarcinomas

d) A cirurgia envolve com frequência a toracotomia

e) São doentes usualmente bem nutridos

**18 – Doente de 70 anos operado ao Esófago está nas 1ªs 24h após a cirurgia e inicia um quadro de febre. Qual será a causa mais provável da febre:**

a- Abcesso intra-abdominal
b- Infecção urinária
c- Infecção da ferida cirúrgica
d- Decorre do trauma cirúrgico
e- Infecção dos cateteres
f- atlectasia

## Cancro Oral

**19 – Qual das seguintes sentenças é <u>verdadeira</u> relativamente ao cancro da cabeça e pescoço e do esófago?**

**a)** O tabaco e o álcool não são os factores etiológicos importantes
**b)** A maioria dos tumores malignos da cabeça e pescoço são carcinomas basocelulares
**c)** As mucosas das diferentes regiões do tubo areodigestivo superior não estão sujeitos aos mesmos carcinogénios
**d)** A invasão da cápsula do gânglio metastizado pela neoplasia maligna é um factor de prognóstico
**e)** 90% destes tumores têm doença localizada (T1, T2, N0) à data do diagnóstico

**20- Qual o tipo histológico mais frequente no cancro da cavidade oral?**

**f)** **a)** Carcinoma mucoepidermoide
**g)** b) Carcinoma Epidermoide
**h)** c) Sarcoma de Kaposi
**i)** d) Adenocarcinoma

**21- Qual a melhor abordagem no cancro da cavidade oral com metástase extracapsular?**

a) Cirurgia com esvaziamento ganglionar seguido de RT + QT adjuvante

b) Cirurgia com esvaziamento ganglionar seguido de RT adjuvante

c) RT + QT radical

d) Cirurgia com esvaziamento ganglionar seguido de QT adjuvante

## Cuidados Paliativos - Dor

**22 – Em relação à dor crónica, assinale a falsa:**

a) Tem uma duração maior que 6 meses;

b) Tem um carácter de aviso ou alarme;

c) Associa-se a alterações emocionais;

d) Permanece mesmo que a lesão que a originou tenha desaparecido.

**23 - O efeito secundário mais frequente nos tratamentos prolongados com opióides é:**

a) Vómitos;

b) Náuseas;

c) Obstipação;

d) Sedação;

e) Depressão respiratória.

**24 – Das afirmações seguintes, assinale a Falsa:**

a) Todos os tipos de dor respondem bem à morfina;

b) A morfina pode criar tolerância;

c) A morfina é o opióide mais utilizado no tratamento da dor oncológica;

d) Há doentes que não toleram a morfina e que respondem bem a outro tipo de opióides;

e) A naloxona antagoniza o efeito da morfina.

**Organização**

**25 – A reunião da decisão multidisciplinar é na oncologia moderna um momento importante e fundamental (assinale a verdadeira).**

a) É a reunião onde as várias especialidades e modalidades terapêuticas discutem cada caso clinico e estabelecem a estratégia e sequência de tratamento

b) As especialidades cirúrgicas são as mais importantes

c) A especialidade de oncologia médica (quimioterapia) é a mais importante

d) A especialidade de radioterapia é a mais importante

e) Todas são verdadeiras

## Colo Uterino

### 26 – Em relação ao cancro do colo uterino (assinale a Falsa).

a) O tipo histológico mais frequente é o espinocelular

b) O víus HPV e a infecção por clamídia estão envolvidos na sua génese

c) O rastreio é fundamental para diminuir a mortalidade

d) A vacina contra o HPV não tem interesse na prevenção deste tumor

e) A radioterapia é útil nos tumores avançados

## Cancro cólon e recto

### 2 – Cancro do colon e recto (assinale a falsa)

a) O adenocarcinoma é o tipo histológico mais frequente

b) A anemia é frequente nos tumores do cólon direito

c) Sintomas obstrutivos são mais frequentes nos tumores à esquerda

d) No cancro do recto há com frequência tenesmo e retorragias

e) A remoção das metástases hepáticas não aumenta a sobrevivência

### 28 – Cancro do colon e recto (assinale a falsa)

a) As mutações dos genes *Ras* têm impacto na escolha do tratamento com anticorpos

b) A radioterapia é importante nos tumores do recto localmente avançados

c) A quimioterapia pode ser útil no aumento da resposta à radioterapia

d) A ressecção de metástases pulmonares únicas tem impacto no prognóstico

e) O número mínimo de gânglios isolados deve ser de 8

**29 – Cancro do colon e recto (assinale a falsa)**

a) A colonoscopia é fundamental para o diagnóstico

b) O Tac abdominal é um exame de estadiamento importante

c) no caso de não existir ressonância Magnética pélvica a eco-endoscopia retal pode ser útil

d) Os pólipos adenomatosos com displasia de baixo grau são lesões cancerosas

e) Por vezes é necessário fazer colostomia antes de tratar com Quimioterapia e radioterapia um cancro do recto obstrutivo.

**Cancro da Próstata**

**30 – Geralmente, os sintomas de cancro da próstata incluem: (assinale a Falsa).**

a) Incapacidade de urinar, ou dificuldade em iniciar ou parar o fluxo de urina.

b) Necessidade frequente de urinar, principalmente à noite.

c) Fluxo de urina fraco ou intermitente.

d) Dor ou ardor durante a micção.

e) Pús na uretra.

f) Sangue na urina ou no sémen.

g) Dor frequente na zona inferior das costas, nas ancas ou na zona superior das coxas

# VI – Aproval from MCH

MINISTÉRIO DA SAÚDE
HOSPITAL CENTRAL DE MAPUTO
DIRECÇÃO CIENTÍFICA E PEDAGÓGICA

Ao
Comité Institucional da Bioética para a Saúde
Faculdade de Medicina

N:Ref:353/0241/DCIEF-HCM/17

Maputo, aos 25 de Maio de 2017

Assunto: **Carta de Cobertura**

Remetemos a V.Excia o protocolo intitulado, **" Intervenção no Departamento de Cirurgia do Hospital Central de Maputo no sentido de assegurar os melhores cuidados oncológicos aos utentes: Estudo do perfil clínico-patológico das doenças oncológicas prevalentes e dos recursos humanos, técnicose formativos necessários"**, destinado a recolha de dados, no Departamento de Cirurgia do HCM cujo autor é o Dr. **Atílio Morais.**

Solicitamos a Vossa apreciação e aprovação ética.

Atenciosamente,

A Directora Científica e Pedagógica

**Prof. Doutora Sandra Mavale**

Pediatra/Pneumologista Pediatra/PhD

Hospital Central de Maputo. Av. Agostinho Neto 1164. Tel/Fax 21320287/8

## VII - Aproval from Comité Cientifico da Faculdade de Medicina (UEM)

UNIVERSIDADE EDUARDO MONDLANE

Faculdade de Medicina

Atílio

**CONSELHO CIENTÍFICO**

**Exmo. Senhor**
**Investigador**
**Atílio Morais**

Maputo, aos 26/10/2018

**Assunto:** Pesquisa de implementação para melhoria de cuidados em oncologia cirurgia do Hospital Central de Maputo.

O Conselho Científico da Faculdade de Medicina analisou as correcções efectuadas no protocolo acima mencionado e sobre o mesmo chegou a seguinte conclusão:

- O Conselho Científico da Faculdade de Medicina não vê nenhum inconveniente que impeça a realização do estudo pelo que, dá a sua devida aprovação.
- O Conselho Científico da Faculdade de Medicina recomenda que a investigadora o mantenha informado do decurso do estudo.

Sem mais de momento as nossas cordiais saudações.

A Presidente do Conselho Científico

Prof. Doutora Esperança Sevene Comiches, MD, MSc, PhD
(Professora Associada)

Av. Salvador Allende, nº 702, C. Postal 257, Tel.: (+258) 21 428076, Fax.: (+258) 21 325255,
Maputo – Moçambique

# VIII - Aproval from Comité Nacional de Bioética

UNIVERSIDADE EDUARDO MONDLANE

**Comité Institucional de Bioética em Saúde da Faculdade de Medicina/Hospital Central de Maputo**

**(CIBS FM&HCM)**

*Dr. Jahit Sacarlal, Presidente do Comité Institucional de Bioética em Saúde da Faculdade de Medicina/Hospital Central de Maputo (CIBS FM&HCM)*

*CERTIFICA*

*Que este Comité avaliou a proposta do Investigador Principal:*
*Nome:* ***Atílio Luís Monteiro de Morais***
*Protocolo de investigação:* ***Sem versão de Ssetembro de 2017***
*Consentimentos informados:* ***Sem versão e sem data***
*Questionários:* ***Sem versão e sem data***
*Guião de entrevista: N/A*

*Do estudo:*
*TÍTULO:* **"Pesquisa de implementação para melhoria de cuidados em oncologia cirúrgica no Departamento de Cirurgias do Hospital Central de Maputo"**

*E faz constar que:*
*1º Após revisão pelos membros do Comité do protocolo durante a reunião do dia 01 de Dezembro de 2018, e que foram incluídas na acta nº 11/2018, o CIBS FM&HCM, emite este informe notando que não há nenhuma inconveniência de ordem ética que impeça o início do estudo.*
*2º A revisão se realizou de acordo com o Regulamento do Comité Institucional da FM&HCM – emenda 2 de 28 de Julho de 2014.*
*3º O protocolo está registado com o número CIBS FM&HCM/077/2018.*
*4º Que a composição actual do CIBS FM&HCM está disponível na secretária do Comité.*
5º Não foi declarado nenhum conflito de interesse pelos membros do CIBS FM&HCM
*6º O CIBS FM&HCM faz notar que a aprovação ética não substitui a aprovação científica nem a autorização administrativa.*
*7º A aprovação tem validade de 1 ano e termina a 06 de Fevereiro de 2020. Um mês antes dessa data o Investigador deve enviar um pedido de renovação se necessitar.*
*8º Recomenda aos investigadores que mantenham o CIBS informado do decurso do estudo no mínimo uma vez ao ano.*
*9º Solicitamos aos investigadores que enviem no final de estudo um relatório dos resultados obtidos.*

***E emite***
*RESULTADO:* ***APROVADO***

CIBS

*Assinado em Maputo aos 07 de Fevereiro de 2019*

## IX - **Fellowship in Surgical Oncology**

# ORDEM DOS MÉDICOS DE MOÇAMBIQUE

# PROGRAMA DE FORMAÇÃO NA SUBESPECIALIDADE DE ONCOLOGIA CIRÚRGICA

**Motivos justificativos da criação da Subespecialidade**

A taxa de incidência das doenças oncológicas está a aumentar em Moçambique em função do envelhecimento da população e exposição a factores de risco. Estima-se que em 2030 ocorrerão, no país, cerca de 35788 novos casos.

O tratamento cirúrgico das neoplasias sólidas é a arma terapêutica mais vezes utilizada nos diversos momentos da doença, mesmo em situações de doença avançada. O tratamento de complicações após a progressão da doença e a colocação de dispositivos médicos para assegurar o tratamento sistémico, são outras actividades cirúrgicas relevantes. Os programas de formação pré e pós-graduada, no presente momento, não oferecem uma capacidade formativa organizada e consistente em oncologia cirúrgica. Assim, é desejável que seja criada uma oportunidade formativa que colmate as lacunas referidas no contexto de internato de especialidade e que tenha a abrangência necessária no sentido de galvanizar o interesse de outras especialidades cirúrgicas.

**Objetivos gerais do Subespecialidade**

O objectivo principal desta subespecialidade é formar cirurgiões que aliem a capacidade de realizar procedimentos cirúrgicos complexos aos princípios básicos do tratamento multidisciplinar do cancro de forma sistematizada e que tenham conhecimentos de epidemiologia, de diagnóstico, biologia, tratamento sistémico, radioterapia e cuidados paliativos. Este curso foi elaborado com base nos programas de formação das Sociedades Europeia, Americana e Asiatica de Oncologia Cirúrgica.

Pretende-se que esta subespecialidade proporcione educação transversal específica em oncologia e o tratamento cirúrgico destas doenças sendo complementar ao ensino de oncologia integrado nos internatos das especialidades cirúrgicas. Complementará assim o treinamento em oncologia, fornecerá elementos de reflexão transversal e contextualizará o conhecimento adquirido em exemplos práticos de situações reais. A multidisciplinaridade na decisão terapêutica, na preparação dos doentes para a cirurgia e no tratamento global de doenças oncológicas específicas, serão elementos que enriquecerão este momento de aprendizagem.

Objetivos específicos:

*a*) Dar aos estudantes os conhecimentos necessários para a compreensão dos fundamentos científicos e clínicos da Oncológica Cirúrgica;
*b*) Dar aos alunos os conhecimentos de Oncologia;
*c*) Avaliação e diagnóstico clínico no âmbito de oncologia Cirúrgica;
*d*) Avaliar fatores de risco sistémicos e comportamentais, perspetivando o doente como um todo e com possível necessidade de tratamento integrado multidisciplinar;
*e*) Reconhecer a existência de contra-indicações cirúrgicas relativas e absolutas num contexto multidisciplinar;
*f*) Ensinar os melhores procedimentos de diagnóstico, plano de tratamento, numa perspetiva da Oncologia Baseada na Evidência e Personalizada;
*g*) Adquirir competências em técnicas de Oncologia Cirúrgica;
*h*) Ensinar o domínio das técnicas e aptidões necessárias para a prevenção e resolução de possíveis complicações;
*i*) Reconhecer os princípios éticos, o enquadramento legal e centrado no doente do tratamento oncológico;
*j*) Garantir competências relacionadas com a metodologia da investigação, incentivando a produção científica em áreas de Oncologia Cirúrgica.

**Resultados de aprendizagem**

Conhecimentos, competências e aptidões que os estudantes devem alcançar

Pretende-se que após completar a subespecialidade em oncologia cirúrgica seja capaz de:

• Reconhecer sintomas e sinais das doenças oncológicas;

• Realizar o diagnóstico de doenças oncológicas;

• Realizar o estadiamento dos tumores malignos;

• Realizar a avaliação prognóstica;

• Definir o papel da cirurgia numa determinada doença oncológica de acordo com a condição geral do doente, de acordo com uma abordagem multidisciplinar;

• Realizar uma investigação pré-operatória adequada;

• Realizar a preparação do doente para a cirurgia, isto é pré-habilitação adequada;

• **Realizar o tratamento cirúrgico de neoplasias malignas** (de acordo com a especialidade de origem) **com alta habilidade e qualidade**

• Ser proficiente nos cuidados pós-operatórios;

• Decidir e realizar o acompanhamento adequado;

• Implementar diretrizes nacionais de acordo com cada neoplasia maligna;

• Manter-se atualizado em relação ao diagnóstico e tratamento das doenças oncológicas e os ensaios clínicos em curso;

• Realizar tratamento cirúrgico paliativo, atendimento de suporte;

• Diagnosticar, classificar e tratar efeitos colaterais e complicações do tratamento cirúrgico;

• Avaliar o impacto das intervenções cirúrgicas na qualidade de vida;

• Comunicar de maneira precisa e adequada aos doentes com cancro e seus familiares;

• Gerenciar reações psicológicas comuns ao diagnóstico e estágio final da vida;

• Praticar medicina de acordo com a ética médica e os direitos do doente.

**Destinatários**

Especialistas de áreas cirúrgicas, noeadamente da Cirurgia geral, Cirurgia torácica, Urologia, Cirurgia Máxilo-facial, ORL, Cirurgia plástica, Coloprotologia, e demais que possam advir.

**Condições específicas de acesso/ingresso no curso/unidade de formação**

1-Ser titular de uma especialidade cirúrgica (Cirurgia geral, Cirurgia torácica, Urologia, Cirurgia Máxilo-facial, ORL, Cirurgia plástica, Coloproctologia, etc.)
2-Cumprir com o regulamentado (ver regulamento dos Colégios de Especialidade/Comissão Nacional de Residencias Médicas-CNRM)

**Critérios de seleção e seriação dos candidatos e respetivas ponderações**

1 — Caberá aos colégios (Cirurgia geral, Cirurgia torácica, Urologia, Cirurgia Máxilo-facial, ORL, Cirurgia plástica, Coloprotologia, etc.) a seleção dos candidatos.

**Organização da subespecialidade**

| **Unidades Curriculares** | **Local** | **Metodologia** | **Duração** |
|---|---|---|---|
| **Princípios de oncologia**<br><br>Carcinogénese | País | Teórica e prática | Nos primeiros 3 meses da subespecialidade |

| | | | |
|---|---|---|---|
| Epidemiologia do cancro<br><br>Prevenção de cancro<br><br>Biologia das radiações<br><br>Princípios de quimioterapia e terapêutica direcionada<br><br>Cuidados paliativos<br><br>Ensaios clínicos<br><br>Comunicação em oncologia<br><br>O papel da Consulta multidisciplinar- | | | |
| **Competências específicas** | Entender a cinética tumoral, incluindo a biologia do crescimento tumoral e regimes terapêuticos, incluindo quimioterapia, radioterapia e imunoterapia;<br><br>Entender os princípios básicos de oncologia cirúrgica;<br><br>Ser capaz de delinear uma estratégia de tratamento dos tipos mais comuns de cancro com base no estádio da doença. Este pode ser locoregional (cirúrgica e radioterapia) e sistémica, se indicado;<br><br>Ser capaz de delinear um plano unificado de tratamento para os tumores malignos mais comuns com base no estádio, tipo de cancro, localização e potencial de ressecção;<br><br>Conhecer os princípios e a abordagem nos tumores malignos mais comuns, incluindo uma compreensão detalhada da abordagem cirúrgica.<br><br>Ter um entendimento global sobre os tumores mais comuns, como a mama, sarcomas, hépato-bilio-pancreático e gastrointestinal;<br><br>Tem um entendimento global sobre os tumores malignos associados a sua especialidade de base. | | |

| | | | |
|---|---|---|---|
| **Competências clínicas gerais**<br><br>Interpretação dos exames complementares especialmente os imagiológicos;<br><br>Avaliação pré-operatória e pré-habilitação;<br><br>Cuidados perioperatórios;<br><br>Cuidados e reabilitação pós-operatória; | País | Teórica e prática | Nos segundos 3 meses da subespecialidade |
| **Competências** | Saber interpretar tomografias computadorizadas de cabeça e pescoço, tórax, abdómen e pélvis, mamografia, e outros estudos imagiológicos de importância em oncologia. Interpretar os valores laboratoriais, incluindo marcadores tumorais;<br><br>Ter um conhecimento prático da avaliação global de um doente oncológico que vai ser operado nomeadamente a avaliação do risco cirúrgico. Conhecer as indicações para exames complementares e saber interpretá-los ao avaliar um doente;<br><br>Ser capaz de realizar uma história clínica abrangente e exame físico num doente oncológico cirúrgico;<br><br>Ser capaz de realizar os cuidados pré e pós-operatórios incluindo a pré-habilitação, adequados ao doente oncológico cirúrgico em causa.<br><br>Gestão: 1. Dos cuidados cirúrgicos diários 2. Das conferências e reunião didáticas bem como as visitas clínicas;<br><br>Tomar decisões após as visitas diárias;<br><br>Organizar e direcionar a ressuscitação de pacientes graves oncológicos cirúrgicos no pós-operatório. | | |

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| | Os estudantes compreenderão e adoptarão as recomendações clínicas disponíveis e reconhecerão as limitações dessas recomendações. Eles integrarão a equipa de cuidados, com outros especialistas médicos, enfermeiros, psicólogos e assistentes sociais no sentido de coordenar e melhorar a qualidade dos cuidados e os resultados;<br><br>Integrarão a Consulta Multidisciplinar no sentido de optimizar o tratamento de acordo com o estádio da doença e a condição do doente. | | |
| **Cirurgia Oncologica específica**<br><br>Cancro da mama<br><br>Cancro colorectal<br><br>Cancro gastrointestinal superior (esófago, gástrico, GIST, intestino delgado)<br><br>Cancro torácico<br><br>Cancro hepatobiliopancreático<br><br>Cancro de pele e melanoma<br><br>Cancro urológico<br><br>Tumores endócrinos (tireóide, paratireóide, supra renal e neuro-endócrina pancreático)<br><br>Sarcomas<br><br>Cancro ginecológico<br><br>Carcinomatose e tumores peritoneais | País e estrangeiro | Teórico e prático | Nos 17 meses seguintes da subespecialidade |

| | |
|---|---|
| **Competências** | Ter um conhecimento prático de anatomia cirúrgica, ressecção cirúrgica de acordo com o estádio da doença oncológica, tipo e localização;<br><br>Ser capaz de executar os seguintes procedimentos cirúrgicos: 1. Biópsia da mama 2. Biópsia de gânglio sentinela 3. Colocação e remoção de cateter venoso totalmente implantado.<br><br>Ser capaz de executar os seguintes procedimentos: 1. Mastectomias 2. Ressecção do cólon e 3. Ressecção gástrica (para as outras especialidades cirúrgicas são definidos os procedimentos sobre os tumores malignos mais frequentes);<br><br>Aprender a actuar perante situações cirúrgicas complexas em doentes de oncologia cirúrgica;<br><br>Assumir a responsabilidade no serviço e alcançar habilidades técnicas complexas necessárias para o gerenciamento de: 1. Cirurgia gastrointestinal complexa importante 2. Ressecção hepática 3. Ressecções mais complexas oncológicas 4. Operações pancreáticas. (para as outras especialidades cirúrgicas são definidos os procedimentos sobre os tumores malignos mais frequentes);<br><br>Lidar com problemas cirúrgicos complexos no paciente de oncologia cirúrgica.<br><br>Saber estabelecer um relacionamento ético com os doentes e familiares, equipa médica, a equipa de enfermagem e o pessoal hospitalar de apoio.<br><br>Demonstrar integridade, responsabilidade, respeito, compaixão, defesa do doente e dedicação nos cuidados do doente. Os estudantes demonstrarão um compromisso com a excelência e profissionalismo.<br><br>Os estudantes serão sensíveis aos custos com os cuidados de saúde, enquanto tentam prestar cuidados de qualidade.<br><br>Ensinar estudantes de medicina e internos mais novos. |

| | | | |
|---|---|---|---|
| **Estágio em oncológica cirúrgica no exterior** | Exterior | Prático | No segundo ano da subespecialidade<br>3 meses |
| **Exame final da subespecialidade Oncologia Cirúrgica** | País | Teórico e prático | No último mês |

| | Jan | Fev | Mar | Abr | Mai | Jun | Jul | Ago |
|---|---|---|---|---|---|---|---|---|
| 1º ano | **Princípios de oncologia** | | | **Competências clínicas gerais** | | | **Cirurgia Onc** | |
| 2º Ano | **Cirurgia Oncológica específica** | | | | | | **Estágio no ex** | |

**Observações**

Aspectos basilares do curso:

- **Surgical Oncology**

Competency Based Curriculum

Goals and Objectives

Medical/Surgical Knowledge

R1/2

1. Know how to interpret CT scans of head, chest, and abdomen, other radiographic studies, mammograms, laboratory values including tumor markers.
2. Understand tumor kinetics including biology of tumor growthand some therapeutic regimens including chemotherapy, radiotherapy, immunotherapy.
3. Understand the basic principles of surgical therapy for cancer.
4. Know basic anatomy of the hepatobiliary tract, pancreas, liver and GI

tract.

5. Have a basic understanding of common cancers, i.e. breast, soft tissue, hepatobiliary, pancreatic, and GI

R4

1. Have a working knowledge of evaluating a surgical oncology patient. Know indications to obtain studies and utilize these studies when evaluating a patient.

2. Be able to outline a basic treatment strategy for treatment of common types of cancer based upon stage. This should be both surgical and chemotherapy if indicated.

3. Have a working knowledge of anatomy and how surgical resection for tumors is influenced by the stage of cancer and the location of the cancer.

R5

1. Be able to outline a unified plan ofcare for common cancers based upon stage, type of cancer, location and potential forresection.

2. Know the principles and approach to common cancers including a detailed understanding of the surgical approach.

Patient Care and Technical Skills:

R1/2

Can expect to learn the listed skills and assume responsibility for managing patients with surgical oncologic problems under the close supervision of a senior resident or attending physician.

1. Be able to complete a comprehensive history and physical for a surgical oncology patient.

2. Be able to do appropriate pre and postoperative care for a surgical oncology patient.

3. Demonstrate basic use of surgical instruments.

Be able to perform the following operative procedures:

1. Breast biopsy

2. Perform a sentinel node biopsy

3. Open and close an abdomen

4. Perform an exploratory laparotomy

5. Mediport placement and removal

R4

Will assume greater responsibility and advanced technical skills. These include:

1. Teaching medical students and junior residents

2. Organizing conferences

3. Organize and direct resuscitation of critically ill postoperative surgical oncology patients

4. Make daily management decisions

Be able to perform the following procedures:

1. Mastectomies

2. Colonic resection

3. Gastric resection

R5

Will assume major responsibility on the service and have achieved complex technical skills required for the management of:

1. Daily surgical care

2. Organization of teaching conferences and rounds

3. Assigning resident staff to operative procedures

4. Deal with complex surgical problems in the surgical oncology patient

The following procedures including:

1. Major complex gastrointestinal surgery

2. Hepatic resection

3. Major cancer resections

4. Pancreatic operations

Interpersonal and Communication Skills

R1/2 residents will develop and refine their individual style when communicating with patients.

• They will strive to create ethically sound relationships with patients, the physician team, the care team and the supporting hospital personnel. They will effectively communicate through accurate and complete notes on the

electronic medical record.

• They will exhibit listening skills appropriate to patient-centered interviewing and communication.

• Residents will be able to communicate with patients concerning end-of life decisions.

PGY-4 and PGY-5 or 6 residents will exhibit team leadership skills through effective communication as a team manager.

• PGY-4 and PGY-5 or 6 residents are expected to assist junior peers, medical students and other hospital personnel to form professional relationships with support staff. Residents will respond to feedback in an appropriate manner and make necessary behavioral changes. Residents should be able to negotiate nearly all difficult patient encounters.

• PGY-4 and PGY-5 or 6 residents should function as team leaders with decreasing reliance on attending physicians.

Professionalism

• All residents will demonstrate integrity, accountability, respect, compassion, patient advocacy, and dedication to patient care that supercedes self-interest. Residents will demonstrate a commitment to excellence and continuous professional development. They will be punctual and prepared for teaching sessions.

• Residents will demonstrate a commitment to ethical principles pertaining to provision or withholding clinical care, confidentiality of patient information and informed consent.

• Residents are expected to show sensitivity and responsiveness to patients' culture, age, gender, and disabilities.

Practice Based Learning and Improvement

R1/2 residents will use hospital and University library resources to critically appraise medical literature and apply evident to patient care.

• They will use electronic and paper references to support patient care and self-education.

• They will model these behaviors to assist medical students in their own acquisition of knowledge through technology

R4/5 residents will consistently seek out and analyze data on practice

experience, identify areas for improvement in knowledge or patient care performance and make appropriate adjustments.

• They will regularly demonstrate knowledge of the impact of study design on validity or applicability to individual practice.

• R5 residents will model independent learning and development and assist with the learning and development of junior residents.

Systems Based Practice

R1 residents will be sensitive to health care costs while striving to provide quality care. They will begin to understand the place of appropriate consultation for the best care of their patients.

R2 residents will understand and adopt available clinical practice guidelines and recognize the limitations of these guidelines. They will work with patient care managers, discharge coordinators and social workers to coordinate and improve patient care and outcomes.

R4/5 residents will utilize out-of-hospital resources to assist patients with therapeutic plans. These senior residents are expected to model cost-effective therapy

Descrição do Curriculum da subespecialidade (de acordo com o modelo da ESSO e que será a base do curso com um programa adicional de cabeça e pescoço, uma vez que este tema não é abordado no programa da ESSO)

**https://www.uemssurg.org/__data/assets/pdf_file/0003/8247/ESSO-core-curriculum-2013.pdf**

**Constituição da equipa docente**

| Nome completo | Grau académico | Área científica do grau | Unidade orgân | Outra instituição | Informação relevante à lecionação na |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| | | | **ica da HCM** | | **subespecialidade** |
| Lúcio Lara Santos | Doutor | Medicina | | | (exemplo…) |
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## Anexo I – Ficha de unidade curricular

Preencher para cada unidade curricular que compõe o plano de estudos.

| | |
|---|---|
| **Unidade curricular** | **Princípios de Oncologia** |
| **Docente responsável** | Prof. Dra. Carla Carrilho |

**Outro(s) docente(s)**

Prof. Dra. Cesaltina Lorenzoni, Prof. Dr. Mamudo, Prof. Manuel Simão, Dr. Satish Túlsidas, Dr. Gudo Morais, Dr. Jotamo Come, etc.

**Conteúdos programáticos**

Carcinogénese

Epidemiologia do cancro

Prevenção de cancro

Princípios da oncologia cirúrgica

Biologia das radiações

Princípios de quimioterapia e terapêutica direccionada

Cuidados paliativos

Ensaios clínicos

Comunicação em oncologia

**Resultados de aprendizagem**

*Conhecimentos, competências e aptidões que os estudantes devem alcançar na unidade curricular*

Os residentes no final da UC adquirem conhecimento em oncologia básica, cuidados paliativos e ensaios clínicos. Saberão como realizar a comunicação com proficiência com o doente, familiares e equipa de saúde.

**Metodologias de ensino**

Através das sessões teóricas e práticas guiadas, o estudante adquirirá os conhecimentos necessários sobre os princípios de oncologia.

**Modalidades de avaliação**

*Dever-se-ão indicar todos os elementos de avaliação e respetivo peso na classificação final*

A avaliação deste módulo será realizada por uma prova escrita no final da mesma.

## Bibliografia principal

Livros

John Niederhuber James Armitage James Doroshow Michael Kastan Joel Tepper: Abeloff's Clinical Oncology
6th Edition.
The MD Anderson Surgical Oncology Handbook. 5th Edition. Feig BW and Ching CD. Kluwer Wolters/Lippincott Williams & Wilkins, 2019.
Surgical Oncology (Oxford Specialist Handbooks in Surgery), Chaudry MA and Winslet MC. OUP Oxford, 2009.
Atlas Of Procedures In Surgical Oncology With Critical, Evidence-Based Commentary Notes (with Dvd-Rom) - RA. Audisio (Editor), World Scientific Publ. 2011
Oxford Handbook of Palliative Care (Oxford Medical Handbooks) Watson M, Lucas C, Hoy A and Wells J. OUP Oxford 2009
Clinical Oncology: Basic Principles and Practice, Neal AJ, Hoskin PJ. Hodder Arnold, 4th Edition, 2009.
Oxford Handbook of Oncology (Oxford Medical Handbooks) Cassidy J, Bissett D, Spence R and Payne M. OUP Oxford, 3rd Edition, 2010.

Serão indicados artigos actualizados sobre os temas.

Artigos

1. Costa A, Van Hemelryck F, Aparicio A, Gatzemeier W, Leer JW, Maillet B, et al. Continuing medical education in Europe: towards a harmonised system. Eur J Cancer 2010;46(13):2340-3.
2. Benes V. The European Working Time Directive and the effects on training of surgical specialists (doctors in training): a position paper of the surgical disciplines of the countries of the EU. Acta Neurochir (Wien) 2006;148(11):1227-33.

3. Parsons BA, Blencowe NS, Hollowood AD, Grant JR. Surgical training: the impact of changes in curriculum and experience. J Surg Educ 2011;68(1):44-51.

4. Naredi P, Leidenius M, Hocevar M, Roelofesen F, van de Velde C, Audisio RA. Recommended core curriculum for the specialist training in surgical oncology within Europe. Surg Oncol 2008;17(4):271-5.

5. Naredi P, Audisio RA, Taylor I. Why do we need a core curriculum in surgical oncology in Europe? Surg Oncol 2008;17(4):267-9.

6. Whale S. Developments in the European Legal Orders: Implications for the Medical Profession. The Medico-Legal Journal 2002;70(April):1-7.

7. Smith JK, McPhee JT, Hill JS, Whalen GF, Sullivan ME, Litwin DE, et al. National outcomes after gastric resection for neoplasm. Arch Surg 2007;142(4):387-93.

8. Skipworth RJ, Parks RW, Stephens NA, Graham C, Brewster DH, Garden OJ, et al. The relationship between hospital volume and post-operative mortality rates for upper gastrointestinal cancer resections: Scotland 1982-2003. Eur J Surg Oncol 2010;36(2):141-7.

9. Gruen RL, Pitt V, Green S, Parkhill A, Campbell D, Jolley D. The effect of provider case volume on cancer mortality: systematic review and meta-analysis. CA Cancer J Clin 2009;59(3):192-211.

10. Michelassi F. 2010 SSO presidential address: subspecialty certificate in advanced surgical oncology. Ann Surg Oncol 2010;17(12):3094-103.

11. Leer JW, Overgaard J, Heeren G. The European core curriculum on radiotherapy. Radiother Oncol 1991;22(3):153-5.

12. Baumann ML, JWH. Dahl, O. De Neve, W. Hunter, R. Rampling, R. Verfaillie, C. Recommended Curriculum for the Specialist Training of Medical Practitioners in Radiotherapy within Europe. http://www.estroeducation.org/europeantraining/Documents/Core%20Curriculum%20Radiation%20Oncologi sts.pdf 2002:1-10.

13. Recommended ESTRO core curriculum for radiation oncologists/radiotherapists, Third Edition.

http://www.estroeducation.org/europeantraining/Documents/CC_FINALapprovedESTRO_CCApril2010.pdf 2010.

14. Hansen HH, Bajorin DF, Muss HB, Purkalne G, Schrijvers D, Stahel R. Recommendations for a Global Core Curriculum in Medical Oncology. Ann Oncol 2004;15(11):1603-12.

15. Hansen HH, Bajorin DF, Muss HB, Purkalne G, Schrijvers D, Stahel R. Recommendations for a global core curriculum in medical oncology. J Clin Oncol 2004;22(22):4616-25.

**Anexo II – Ficha de unidade curricular**

Preencher para cada unidade curricular que compõe o plano de estudos.

| | |
|---|---|
| **Unidade curricular** | **Competências clínicas gerais** |
| **Docente responsável** | Prof. Manuel Simão |

**Outro(s) docente(s)**

Docentes indicados pelos Directores do Programas de Formação dos colégios envolvidosou Directores dos serviços, baseados na competencia e experiencia. Importante incluír os vindos das areas de Radiologia, Anatomia patológica e Oncologia. Estando aberto a participação de outros colaboradores que se achar necessário.

**Conteúdos programáticos**

Interpretação dos exames complementares especialmente os imagiológicos;
Interpretação dos aspectos moleculares e das biopsias líquidas;
Avaliação do Risco e Fragilidade pré-operatória e pré-habilitação;
Cuidados peri-operatórios;
Cuidados e reabilitação pós-operatória;
O papel da Consulta multidisciplinar

**Resultados de aprendizagem**

*Conhecimentos, competências e aptidões que os estudantes devem alcançar na unidade curricular*

Os residentes no final da UC adquirem competências de diagnóstico e decisão clinica utilizando recursos de imagem e de medicina nuclear mais recentes com importância em oncologia e os resultados moleculares. Saberão calcular o riscos cirúrgicos e a elaborar um programa de pré-habilitação do doente para a cirurgia. Saberão programar e actuar no período peri-operatório e desenvolver as acções conducentes à reabilitação do doente. Conhecerão o papel da consulta multidisciplinar no continuum dos cuidados.

**Metodologias de ensino**

Neste curso, a formação será feita pela abordagem de casos reais tendo como objectivo o reforço das suas competências e habilidades para a resolução dos problemas do doente. Através das sessões teórico-práticas guiadas, o estudante conseguirá reconhecer e discriminar a clínica das situações cirúrgicas mais frequentes em oncologia, reconhecer as técnicas e procedimentos cirúrgicos mais comuns, a sua utilidade e as suas complicações, explicitando as escolhas e o raciocínio clínico efetuado.

**Modalidades de avaliação**

*Dever-se-ão indicar todos os elementos de avaliação e respetivo peso na classificação final*

A avaliação deste módulo incluirá uma prova escrita e uma prova prática.

**Bibliografia principal**

Livros

John Niederhuber James Armitage James Doroshow Michael Kastan Joel Tepper: Abeloff's Clinical Oncology
6th Edition.

The MD Anderson Surgical Oncology Handbook. 5th Edition. Feig BW and Ching CD. Kluwer Wolters/Lippincott Williams & Wilkins, 2019.

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5. Naredi P, Audisio RA, Taylor I. Why do we need a core curriculum in surgical oncology in Europe? Surg Oncol 2008;17(4):267-9.

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7. Smith JK, McPhee JT, Hill JS, Whalen GF, Sullivan ME, Litwin DE, et al. National outcomes after gastric resection for neoplasm. Arch Surg 2007;142(4):387-93.

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9. Gruen RL, Pitt V, Green S, Parkhill A, Campbell D, Jolley D. The effect of provider case volume on cancer mortality: systematic review and meta-analysis. CA Cancer J Clin 2009;59(3):192-211.

10. Michelassi F. 2010 SSO presidential address: subspecialty certificate in advanced surgical oncology. Ann Surg Oncol 2010;17(12):3094-103.

11. Leer JW, Overgaard J, Heeren G. The European core curriculum on radiotherapy. Radiother Oncol 1991;22(3):153-5.

12. Baumann ML, JWH. Dahl, O. De Neve, W. Hunter, R. Rampling, R. Verfaillie, C. Recommended Curriculum for the Specialist Training of Medical Practitioners in Radiotherapy within Europe. http://www.estroeducation.org/europeantraining/Documents/Core%20Curriculum%20Radiation%20Oncologi sts.pdf 2002:1-10.

13. Recommended ESTRO core curriculum for radiation oncologists/radiotherapists, Third Edition. http://www.estroeducation.org/europeantraining/Documents/CC_FINALapprovedESTRO_CCApril2010.pdf 2010.

14. Hansen HH, Bajorin DF, Muss HB, Purkalne G, Schrijvers D, Stahel R. Recommendations for a Global Core Curriculum in Medical Oncology. Ann Oncol 2004;15(11):1603-12.

15. Hansen HH, Bajorin DF, Muss HB, Purkalne G, Schrijvers D, Stahel R. Recommendations for a global core curriculum in medical oncology. J Clin Oncol 2004;22(22):4616-25.

**Anexo III – Ficha de unidade curricular**

Preencher para cada unidade curricular que compõe o plano de estudos.

| | |
|---|---|
| **Unidade curricular** | **Oncologia Cirúrgica** |
| **Docente responsável** | Dr. Atílio Morais |

**Outro(s) docente(s)**

Docentes indicados pelos Directores do Programas de Formação dos colégios envolvidos ou Directores dos serviços, baseados na competencia e experiencia profissional. Importante incluír os vindos das areas de Radiologia, Anatomia patológica e Oncologia. Estando aberto a participação de outros colaboradores que se achar necessário.

**Conteúdos programáticos**

Cancro da mama

Cancro da Cabeça e Pescoço

Cancro colorectal

Cancro gastrointestinal superior (esófago, gástrico, GIST, intestino delgado)

Cancro torácico

Cancro hepatobiliopancreático

Cancro de pele e melanoma

Cancro urológico

Tumores endócrinos (tireóide, paratireóide, supra renal e neuro-endócrina pancreático)

Sarcomas

Cancro ginecológico

Carcinomatose e tumores peritoneais

Actividade Cirúrgica

| Areas | Level 1 | Level 2 | Level 3 | Level 4 |
|---|---|---|---|---|
| 7. Bone, connective tissue and skin | **Melanomas**<br>1. Biopsies<br>2. Enlarged margins<br>**Nonmelanoma**<br>1. Local resections<br>2. Biopsies | **Melanomas**<br>1. Margin enlargement with sentinel lymph node monitoring<br>2. Reconstructions with simple myocutaneous flaps<br>**Nonmelanoma**<br>1. Deep resections<br>2. Reconstructions | **Melanomas**<br>1. Reconstructions with complex myocutaneous flaps<br>**Nonmelanoma**<br>1. Topographic lymphadenectomies<br>2. Extended resections with muscle groups and/or bone/vessels | **Nonmelanoma**<br>1. Resections with preservation of pelvic waist/scapular limb<br>2. Multivisceral resections for retroperitoneal tumors |

**Resultados de aprendizagem**

*Conhecimentos, competências e aptidões que os estudantes devem alcançar na unidade curricular*

Os residentes no final da UC adquirem conhecimentos e competências de diagnóstico, estadiamento e tratamento nas diversas áreas oncológicas que a UC aborda. Saberão calcular os riscos cirúrgicos e a elaborar um programa de pré-habilitação do doente para a cirurgia. Saberão programar e actuar no período peri-operatório e desenvolver as acções conducentes à reabilitação do doente. Conhecerão o papel da consulta multidisciplinar no continuum dos cuidados.

**Metodologias de ensino**

Neste curso, a formação será feita pela abordagem de casos reais tendo como objectivo o reforço das suas competências e habilidades para a resolução dos problemas do doente. Através das sessões teórico-práticas guiadas, o estudante conseguirá reconhecer e discriminar a clínica das situações cirúrgicas mais frequentes em oncologia ( áreas abordadas), reconhecer as técnicas e procedimentos cirúrgicos mais comuns no tratamento dessas neoplasias malignas, a sua utilidade e as suas complicações, explicitando as escolhas e o raciocínio clínico efetuado.

Terão conhecimento dos ensaio clínicos relevantes e a s terapêuticas inovadoras.

Através das sessões teórico-práticas guiadas, o residente conseguirá reconhecer e discriminar a clínica das situações cirúrgicas mais frequentes em oncologia (áreas abordadas), reconhecer as técnicas e procedimentos cirúrgicos mais comuns no tratamento dessas neoplasias malignas, a sua utilidade e as suas complicações, explicitando as escolhas e o raciocínio clínico efetuado.

Aprenderá a realizar as cirurgias de acordo com o programa e relacionadas com os tumores mais frequentes.

**Modalidades de avaliação**

*Dever-se-ão indicar todos os elementos de avaliação e respetivo peso na classificação final*

A avaliação deste módulo incluirá um exame teórico e prático.

## Bibliografia principal

Livros

John Niederhuber James Armitage James Doroshow Michael Kastan Joel Tepper: Abeloff's Clinical Oncology
6th Edition.
The MD Anderson Surgical Oncology Handbook. 5th Edition. Feig BW and Ching CD. Kluwer Wolters/Lippincott Williams & Wilkins, 2019.
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**Anexo III – Ficha de unidade curricular**

Preencher para cada unidade curricular que compõe o plano de estudos.

| | |
|---|---|
| **Unidade curricular** | **Estágio prático em Oncologia Cirúrgica no exterior do país** |
| **Docente responsável** | Dependerá do campo de estagio definido pelo colégio. As lideranças nestes campos, indicarão os docentes responsáveis. Exemplo é o Prof. Doutor Lúcio Lara Santos que será no IPO-Porto, o responsável na area de cirurgia oncológica digestiva (esófago-gástrica, hepática, etc.). |

**Outro(s) docente(s)**

| |
|---|
| Também dependerá campo de estagio definido pelo colégio, embora se perspective uma composição de docentes nacionais (colégio, serviço, etc.) com docentes estrangeiros (provenientes dos campos de estágios definidos). |

**Conteúdos programáticos**

| |
|---|
| Realização dos procedimentos de oncologia cirúrgica referentes a:<br><br>Cancro da mama<br><br>Cancro da Cabeça e Pescoço<br><br>Cancro colorectal<br><br>Cancro gastrointestinal superior (esófago, gástrico, GIST, intestino delgado)<br><br>Cancro torácico<br><br>Cancro hepatobiliopancreático<br><br>Cancro de pele e melanoma<br><br>Cancro urológico<br><br>Tumores endócrinos (tireóide, paratireóide, supra renal e neuro-endócrina pancreático)<br><br>Sarcomas<br><br>Cancro ginecológico<br><br>Carcinomatose e tumores peritoneais |

**Resultados de aprendizagem**

*Conhecimentos, competências e aptidões que os estudantes devem alcançar na unidade curricular*

| |
|---|
| Os residentes no final da estágio adquirem conhecimentos e competências para a realização de procedimentos cirúrgicos complexos nas diversas áreas |

oncológicas que o estágio aborda bem como a organização das unidades oncológicas em hospitais de referência.

**Metodologias de ensino**

Neste curso, a formação será feita pela abordagem de casos reais tendo como objectivo o reforço das suas competências e habilidades para a resolução dos problemas do doente.

Através das sessões teórico-práticas guiadas, o estudante conseguirá reconhecer e discriminar a clínica das situações cirúrgicas mais frequentes em oncologia (áreas abordadas), reconhecer e saber implementar as técnicas e procedimentos cirúrgicos mais comuns no tratamento dessas neoplasias malignas, a sua utilidade e as suas complicações, explicitando as escolhas e o raciocínio clínico efetuado.

Terão conhecimento dos ensaios clínicos relevantes e a s terapêuticas inovadoras.

**Modalidades de avaliação**

A avaliação deste módulo está integrada na avaliação global do curso.

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